JUNIOR MECHANICS AND MODEL AIRPLANE NEWS

A MACFADDEN PUBLICATION
PRICE 15 CENTS
MAY 193

In this Issue – Plans for A WORLD FAMOUS GRAF ZEPPELIN MODEL

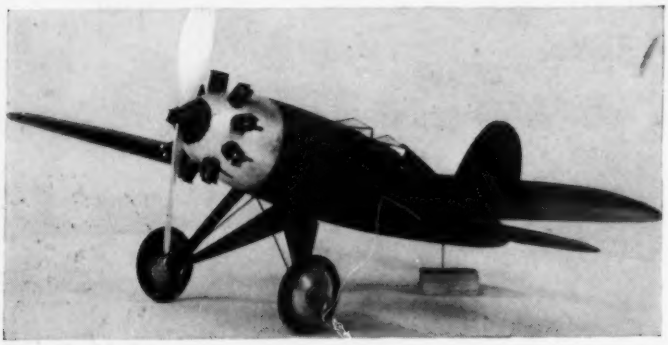
Beginning in this issue
WINGS OF VALOR
By JACK D'ARCY
A New Serial of Warfare in the Clouds

FULL-SIZE PLANS

VOUGHT CORSAIR NAVY FIGHTER
DOUGLAS MAIL PLANE-SOLID SCALE MODEL

SPECIAL HANDICRAFT DEPARTMENT
(R-100, the "TANAGER"
other News and Views)

Hawthorne Models Are FLYING Models



Lockheed "Sirius"

2 Ft. (without N. A. C. A. cowling)

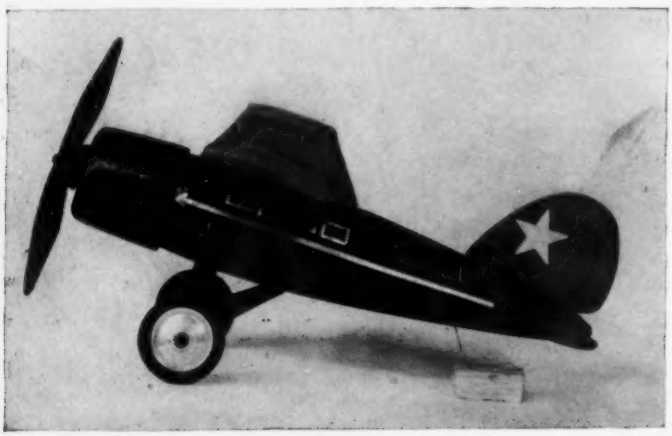
Lindbergh's Latest Plane

This newest creation of the famous Lockheed line makes an excellent flying model. With its streamlined rounded fuselage, tapered wing and absence of wing struts, it presents a clean, fast appearance seen in few planes.

The wonderful design and construction in the Lockheed has been put into the Hawthorne model with the result that in flying ability, strength and type of construction, the last word in up to date models is presented.

With this set is included cut out ribs, fuselage parts shaped, wire parts, wheels, radial motor parts, etc.

Construction set..... **$3.50**



Lockheed "VEGA" 2 Ft.

This famous North and South Pole plane used by Sir Hubert Wilkins, the Arctic explorer, is great for a model. The performance, construction set and price are the same as for the Lockheed Sirius model above.

HAWTHORNE MODEL AIRPLANES

All Hawthorne planes are scientifically designed with flying ability as the first consideration. They contain all the latest improvements in design, and the best points of models that in the last year have won contests.

Hawthorne Model Airplane Supplies are made to satisfy the demands of the most exacting model builder. They are made of the best and lightest material and are used by many of the expert model builders and contest winners of this country.

All Hawthorne construction sets contain every necessary part to make the plane, with extra material included for possible mistakes. Hawthorne planes will fly well when made correctly. The construction used in the real planes is followed as far as possible, with any necessary changes made by expert model makers, in order to increase the flight of the plane.

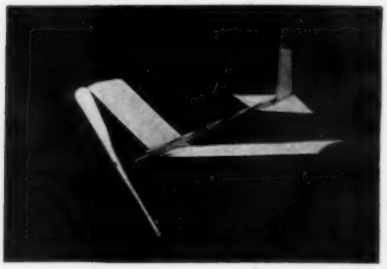
A few features of Hawthorne planes are the celluloid wheels, which are the strongest and lightest for models; also two colors of airplane dope, included with all scale model type planes; the success had by boys who have built these planes.

TWO-FOOT CURTISS HAWK

This is a model of the fast pursuit plane flown by Army and Navy aviators. The weight of this plane is about two ounces, made mostly of balsa wood. Flights of 300 feet and 40 seconds have been reported from boys who have made this plane.

The set for this model contains all necessary parts, including celluloid wheels, cut out body sides, two colors of dope, bent wire parts, plan and directions, etc.

Complete construction set..... **$2.50**



The Baby Tractor is the simplest model to make, and as it contains only just enough parts for flying, will outfly many a larger and more costly model. This model has been flown out of sight many times, under the right conditions, and when fairly well made will average about thirty to sixty seconds duration.

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"Before going to Coyne, I had worked in a garage for five years at $30.00 a week. I had no advanced education and didn't know a volt from an ampere. Yet I graduated in three months with a grade of 98%. Since I left Coyne, I have jumped from $30.00 to $100.00 a week, and am still going strong. I owe all my success to the practical training I got in the Coyne Shops."

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"I knew nothing about Electricity, before I went to Coyne," says Nolan H. McCleary. "I had no advanced education and so little money that I could never have stayed at school, if Mr. Lewis hadn't gotten me a part-time job. Yet I finished the course in twelve weeks, and the School immediately placed me in a fine electrical job. Now I am Chicago District Manager of the largest electrical concern of its kind in the world, making more money than I ever dreamed of making before I went to Coyne. I am convinced that there is but ONE RIGHT WAY to learn electricity and that

NOLAN H. McCLEARY
Chicago District Manager, Beardsley-Wolcott Co.

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JUNIOR MECHANICS
and
MODEL AIRPLANE NEWS

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In Our Next Issue

FULL SIZE PLANS FOR A THREE FOOT MODEL OF THE BARLING NB-3

The plane which has created world's altitude record

—o—

"JUMP"

By Orville H. Kneen

A masterpiece concerning parachutes

—o—

FULL SIZE PLANS FOR A "FLYING GLORY"

The model which flew 1,050 feet

Coming

Watch for our articles by Percival White on gliding, which embody a complete course in this thrilling sport

—o—

Also the start of a course in aeronavigation by Capt. Leslie Potter, noted airman and navigator

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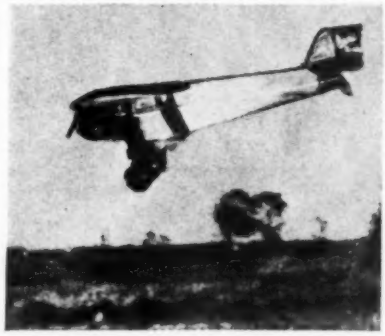

Action Photo of the New York Aviation Show's Prize Winning CURTISS "ROBIN" Flying Scale Model built by Sky Cadet Walter Welsch of Bronx, New York, from A.A.C. Kit.

31" CURTISS "ROBIN" FLYING SCALE MODEL Kit—Complete with colored dopes and full-sized blueprints $6.00

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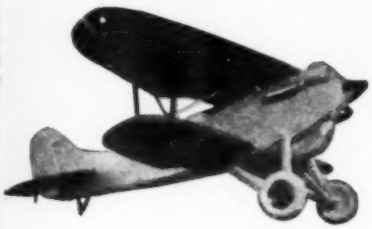

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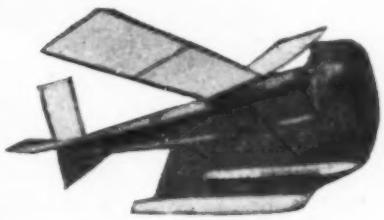
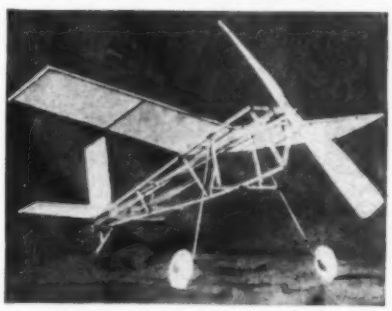


28" "GIANT COMET" CONVERTIBLE LAND AND SEAPLANE FLYER. Kit with full size detailed blueprints, pontoon blocks and pair of celluloid wheels $1.75

New York's Sensation, "THE COMET"



BABY in size; but GIANT in performance. This indoor commercial model is of 11" wingspan and is guaranteed to RISE OFF THE ground. Can be converted into a seaplane if desired. Kit complete with full-sized detailed blueprints and in boxed container. ONLY 75c

A. A. C. CHAMPION TWIN-PUSHER in flight over roof-tops of buildings near our factory. Kit of 36" wingspan model complete with detailed blueprints...$2.50

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Plank Sizes

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By
JACK D'ARCY

WINGS of VALOR

JAMES WEBSTER, senior, took off from the Morgan Flying Field, at Salt Lake City with the Cheyenne mail at precisely 9:30 a. m.

He climbed into the cockpit, waved a genial farewell to Jimmy Webster, junior, his son and aerial protegé, and tentatively revved his motor. As his engine burst into a steady rhythmic beat, and the slip stream hurled its belching breath behind him, the chocks were dragged away, and the Curtiss began her diurnal journey through the heart of the Rockies.

The fresh morning sun prodigally tossed golden sparks of happiness down upon a verdant world. Even the majestic mountain peaks in the distance seemed to strive to hold their heads up higher than usual in order to meet the dancing rays halfway. James Webster inhaled deeply of the invigorating air as his ship droned its steady way through the fragrant springtime breezes.

Almost directly below him, and heading in the opposite direction, was another silver biplane. Webster watched her closely and thrust his arm from the cockpit in salutation to the other pilot. In response, a leather-gloved hand appeared from the ship beneath and waved frantically toward the earth. At precisely the same moment the plane dived crazily, as if out of control.

Without hesitation the air mail pilot killed his motor and shot after it. Everything forgotten in his endeavor to aid a fellow airman in distress, he dived toward the earth without removing his steely gray eyes from the Curtiss below; and breathed a sigh of relief as he saw her achieve a clumsy, but safe landing.

In another moment he was taxying along the uneven valley floor beside her. He sprang from the cockpit to meet two men dressed in dapper, brand-new flying togs, who were standing at the side of their motionless ship.

Webster smiled tolerantly to himself. Some more air amateurs, he thought.

"What's wrong?" he asked affably. "You gave me a scare for a moment but I see you made it all right."

The taller of the two men answered him.

"Yeah, we made it," he said with a rueful grin. "Dumb luck, I guess. Something wrong with the engine. Neither of us knows much about it. Will you take a look at her?"

"Sure," said the mail pilot, peeling off his heavy gloves and approaching the ship.

The strangers followed him to the forepart of the fuselage.

"Can't be anything serious if you got down O. K.," said Webster, as he bent over the cowling to examine the engine.

HE turned swiftly at the sound of a stealthy footstep, but it was too late. He caught a fleeting glimpse of a wrench hurtling through the air. His last conscious picture was that of an evil, grinning face with a white, crescent-shaped scar on its left cheek. But before he could move a muscle, there was a dull thud, a blinding flash across his eyes, and then . . . utter, impenetrable darkness.

At about four o'clock that afternoon, young Jimmy Webster sat idly in the office of the field superintendent. The super leaned over his desk and studied a

Father and Son Defend the United States Air Mail Against a Marauding Band

Webster turned, but it was too late—a wrench hurtled through the air!

handful of impressive looking papers. Jimmy slowly turned the pages of a newspaper, and waited patiently for his father's return.

The Websters—father and son—were even more to each other than that relationship implies. Ever since the death of Jimmy's mother, some three years ago, Webster, senior, had performed the duties of both parents to his boy. Skilfully and patiently he had instructed him in the art of flying; and, save in the important matter of experience, Jimmy had imbibed deeply of his father's knowledge.

Suddenly the telephone on the super's littered desk jangled noisly. The super barked into the mouthpiece.

"Hello. What? Not there yet? Sure. He left here at ten this morning. Maybe he conked. Send someone out on your end. I'll shoot a man out from here."

He replaced the receiver on the hook and turned a worried face to Jimmy.

"That was Cheyenne," he announced gravely. "Your dad's not there yet. Something must have happened. Take a ship over the route as far as Rock Springs. Keep her low and slow. He must have landed somewhere along the way. It certainly couldn't have been the weather. Must have been engine trouble. Go ahead. Phone me the minute you find him. I'll wait here for your call."

Hardly awaiting the super's last words, Jimmy raced from the room. He was shouting instructions to the mechanics even as he ran across the field. As he reached the tarmac a speedy Sikorsky monoplane was being rolled out of the hangar. Despite his haste, he swiftly examined the ship, to assure himself that she was thoroughly oiled and fueled. Satisfied that all was well, he sprang easily into the cockpit.

With a practiced hand he revved the motor and listened to its impatient roar, as though the plane, too, were eager to be off in search of the missing mail pilot. He opened the throttle wide and eased her down slowly as the engine warmed up. In response to his wave, the chocks were pulled away and heading her nose into the wind, he rolled down the field, sweeping gracefully from the ground as he pulled back the stick.

The stalwart elms at the end of the field flashed by underneath as he zoomed, his propeller blades whirling in the center of the sun. When his altimeter indicated seven thousand feet, he flattened out, banked, and circled around to the east. Then, recalling the super's instructions, he slowly brought her down again until she was a scant two thousand feet above the earth.

Despite his apprehension for his father, his nerves tingled pleasantly with the thrill of being off the mundane ground once more. Flying was his very life, and though he was at it every day, he never quite lost the joyous impulse in his heart which the roar of the engine and the singing wind brought to him.

As Salt Lake City sped away from him in the distance, he killed his motor and dropped as low as he dared—he was taking no chances of missing his father's ship. His anxious eyes searched every yard of the landscape below him for some telltale mark of the Curtiss mail plane.

KNOWING his father was an expert airman, the possibility of his having made a forced landing did not alarm Jimmy unduly. But his not telephoning was the prime cause for worry. Surely within two or three hours, his father, if uninjured, could have found some farm house from which to communicate with the flying field.

Jimmy stopped in the midst of this speculation and hope welled up in his heart. For there, speeding towards him over the eastern horizon, was a soaring biplane. Jimmy knew well that no mail ship was due at this hour. And though he could easily tell that the oncoming ship was not his father's, he strongly hoped that it had some word of him. Possibly, he thought, some flyer, seeing his father in distress, had stopped and picked him up.

He jerked back on the stick and shot upward to meet the fast approaching silver bird, whose altitude was all of eight thousand feet. Deftly handling his controls, he leveled out and banked slightly in order to pass closely

The planes almost touched but the stranger flew on without a glance

enough to the other plane to recognize those in the cockpit, or to pick up any signal that might be given him.

He gave her just enough gas to maintain flying speed, as the on-rushing Curtiss suddenly disappeared like a desert mirage into the centre of a fluffy cumulus cloud. In another second she rushed out into space again, a scant hundred yards away. Jimmy slowly flew toward her, and stretched his hand eagerly out of the cockpit.

AS the two planes swept past each other there were barely ten feet between their wingtips. Seated at the stick of the other ship was a man. Even in the short moment he had to study the other's face, Jimmy noticed a crescent-shaped white scar across his cheek, just below the flying helmet. But no sign of his father was apparent. The scar-faced pilot ignored his friendly wave, and without so much as a glance at the monoplane, which almost grazed his fuselage, continued his roaring way into the west.

For a moment Jimmy Webster resented the other's ignoring of his salutation, but as the thought of his father returned, he glided toward the earth once more, forgetting the incident. Flying fairly close to the earth, but still maintaining enough altitude to enable him to keep a sweeping survey of the landscape, Jimmy renewed his efforts to locate some sign of the missing mail ship.

He flew a straight course—swerving only to investigate more closely any alien mark upon the terrain below—until the city of Rocky Springs hove into sight. With a heavy heart, he circled the town, keeping a sharp lookout for the other searching flyer from Cheyenne. With no indication of him in the summer sky, fast turning to the rich gray that comes with dusk, he pushed the monoplane's nose into the west, and roared homeward, eager to learn if any news of his father had been received.

The friendly summer sun had dropped down behind the snow capped Rockies and the silver stars had burst into light, as though switched on by an invisible hand, when Jimmy Webster swooped down over the elms and taxied across Morgan Field. He shut off his motor and came to a graceful gliding stop in the dead center of the tarmac.

He was met by a dozen excited mechanics and an even more excited superintendent.

"Jimmy, Jimmy, did you see him?" shouted the latter, almost before the drone of the engine had completely died down.

Jimmy turned a puzzled face to the field chief.

"See him?" he repeated. "No. Not a sign all along the route. Have you heard anything?"

The super waved a white paper that he was clutching in his hand.

"No, no," he yelled. "I don't mean your dad. I mean the other guy."

"What other guy?" demanded Jimmy.

The super, as if suddenly realizing the futility of his excitement, took a grip on himself and with an effort controlled the tremor in his voice. His next words were delivered in his usual business-like tone.

"Come with me to the office at once."

The bewildered Jimmy clambered from the cockpit and followed the stocky, red-faced super to his private sanctum. The super fell into his padded swivel chair with a sigh, and commenced mopping a fevered brow with a huge red handkerchief.

"Boy," he said, "read that."

He tossed the piece of paper crumpled in his hand upon the desk. Jimmy, throwing off his gloves, smoothed it out with oil-stained fingers, and read slowly, giving vent to a whistle of consternation as he did so.

Morgan Flying Field:

We have your pilot and your plane, also the mail. As there is nothing of much value in the mail sacks, we are demanding ten thousand dollars for the return of everything. Late tonight we will fly over your field leaving you definite instructions. You will place the money in a bag and send a flyer to a spot we shall designate, where he will drop the cash. He will then fly immediately back. Do not notify the police or you will never recover your property and your pilot will suffer.

The message was unsigned.

Jimmy replaced the dog-eared piece of paper upon the desk and stared in amazement at the super.

"Where did you get this?" he asked.

The super, who was, by this time, quite calm, lit one dangerous-looking cigar from the butt of its predecessor.

"About an hour before you got back," he answered, "a Curtiss biplane flew over. She came down so low we thought that she was going to land. Instead she dropped a message container, with this in it."

"I saw that plane," Jimmy said excitedly. "Passed him on the way out." *(Continued on page 51)*

How to Build a Vought Corsair

A Good Flying Model of the Navy's Standard Plane

THE Vought Corsair is a high performance, two-place, open cockpit, tractor biplane, designed primarily for military operations and meeting the latest safety requirements for two-seater fighters. While meeting the requirements for military purposes, the "Corsair" makes an excellent plane for private or commercial use where high performance is desired.

The front cockpit can be readily converted to carry a large quantity of cargo and mail; the plane being operated by a pilot in the rear cockpit.

The navy Corsair is usually equipped with a Pratt and Whitney Wasp engine. This engine is a nine cylinder, air-cooled, fixed radial type and develops 425 horsepower at 1,950 r.p.m. The airplane carriers, such as the U. S. S. *Lexington* and *Saratoga*, often carry as many as one hundred Corsairs for fighting purposes, and recently a Corsair made contact with the navy dirigible, Los Angeles, while in the air.

The model Corsair described herein is a flying model of this sturdy little navy flyer and gives promise of winning some of the outdoor rise-off-the-ground contests this summer. The model should take off the ground within three feet and with one hundred-and-twenty-five turns of rubber will stay aloft for forty-five seconds or more.

Constructing the Fuselage

The fuselage is constructed by first cutting out all the necessary balsa formers from your sheet 1/16″ x 2-1/2″ x 18″, these formers are designed as 1 to 7 inclusive and the tail piece. After these have been cut to the correct shape as shown in the drawings, take your knife and strip one of the pieces of split bamboo in 1/16″ x 1/16″ pieces and ambroid these pieces as stringers to the sides and top of fuselage formers as shown in the main drawing of the fuselage.

The motor stick of 3/16″ x 1/4″ x 13-1/2″ balsa is attached to the nose block, which is made from the 3/8″ x 1-3/4″ x 1-3/4″ balsa as shown in the drawing of the nose block. The rear hook and three wire clips that are to be attached to formers 2, 5, and 6 are then bent to shape from number 14 music wire and fastened with ambroid at the points X, after inserting motor stick in fuselage and setting clips in the correct position.

The cockpit former is now made of the wood veneer as shown in the top view of the fuselage, and ambroided in position as shown, between formers 4 and 5. The 1/32″ sheet balsa is now taken and stripped down to make the stringers for holding the rounded shape of the fuselage for tissue covering, the 1/2″ x 1/2″ x 3-1/2″ block is made to the shape shown in the head rest drawing and placed in the position as shown in the fuselage drawing. (Note: it will be seen that in this plane the rear cockpit has been left out to avoid structural weakness in a flying model.)

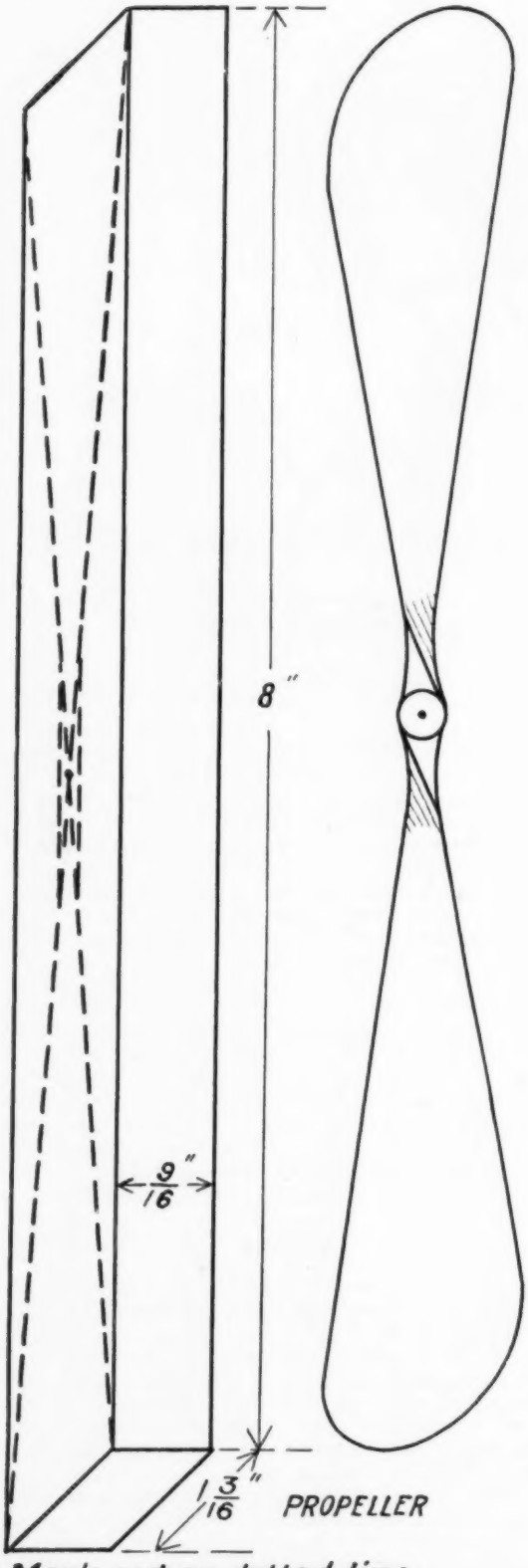
The stabilizer is constructed as shown in the drawing, the four ribs being cut to shape from the 1/16″ sheet balsa as shown. The spar is made from the 1/8″ x 8-1/2″ piece of round wood cut to the correct length with a leading and trailing edge of 1/16″ square bamboo, split from one of the bamboo lengths on hand. The rudder ribs are all cut from 1/16″ sheet balsa with edges of 1/16″ split bamboo. First mount the stabilizer and ambroid in place on the fuselage and then mount the rudder on the top of the stabilizer, as shown in drawing.

Wings

The wings are constructed by first cutting out all the necessary ribs. The upper wings are tackled first. In the building of the upper wings, two sizes of ribs are used, as will be noted in the drawing of the upper wing. These ribs are all cut from the 1/16″ sheet balsa (size 1/16″ x 1-3/4″ x 18″) and the main spars are made from the 1/8″ round wood which should be 24″ long and bent to the correct shape as shown in drawing. (The round wood should be steamed to shape).

Leading and trailing edges are made from 1/16″ square balsa with wing tips made from 1/16″ square split bamboo that is fastened to the leading and trailing edges with the aid of silk thread and ambroid cement.

Lower wing ribs, which are cut from the same 1/16″ sheet balsa, are now cut and sandpapered to the correct shape and camber. There are eight large ribs and two smaller ribs which will be noted by close study of the diagram drawing. The wing is made in one piece



No. 8

with a 1-3/4" opening in the leading and trailing edges, this opening is between the two short ribs. The leading and trailing edges are made from 1/16" square balsa with wing tips made of 1/16" split bamboo and fastened in the same manner as the upper wing tips. The lower wing is then held in place with two pieces of balsa size 1/8" x 1/2" x 2-3/8". (These pieces are cut from the 12" piece on hand.)

These two pieces just described are then held in place with ambroid between formers 4 and 5 with the wing spars pressed tightly between them and the fuselage. The rear end of the inner ribs should be on a line with the rear of the cockpit. The bottom stringer or longeron, which is of 1/16" square bamboo, is then ambroided in place as shown.

Struts

The struts are made from 1/8" x 1/4" balsa, sandpapered to give a streamline effect and cut to the correct lengths as shown in the drawing of the struts. The center section struts are mounted on the front and diagonally in the shape of an inverted "V". The point of the "V" at the front spar on the inner long rib of the lower side of the upper wing. Both sides are made the same. The lower ends of the "V" struts meet formers 3 and 4 in line with the cockpit opening. The rear struts' upper ends are ambroided where the rear spars and inner long rib meet and the lower ends meet former 5 in line with the cockpit. The "N" struts which are placed between the upper and lower wings are located and fastened with ambroid to the front and rear spars at the inner side of the second ribs in from the wing tips. The diagonal section of the "N" struts starts at the top rear spar and runs diagonally to the front lower wing spar, fastened at both points with ambroid.

The tail skid is bent to the correct shape as shown in drawing (number 14 music wire is used for the making of the tail skid) and ambroided in the correct position as shown in drawing.

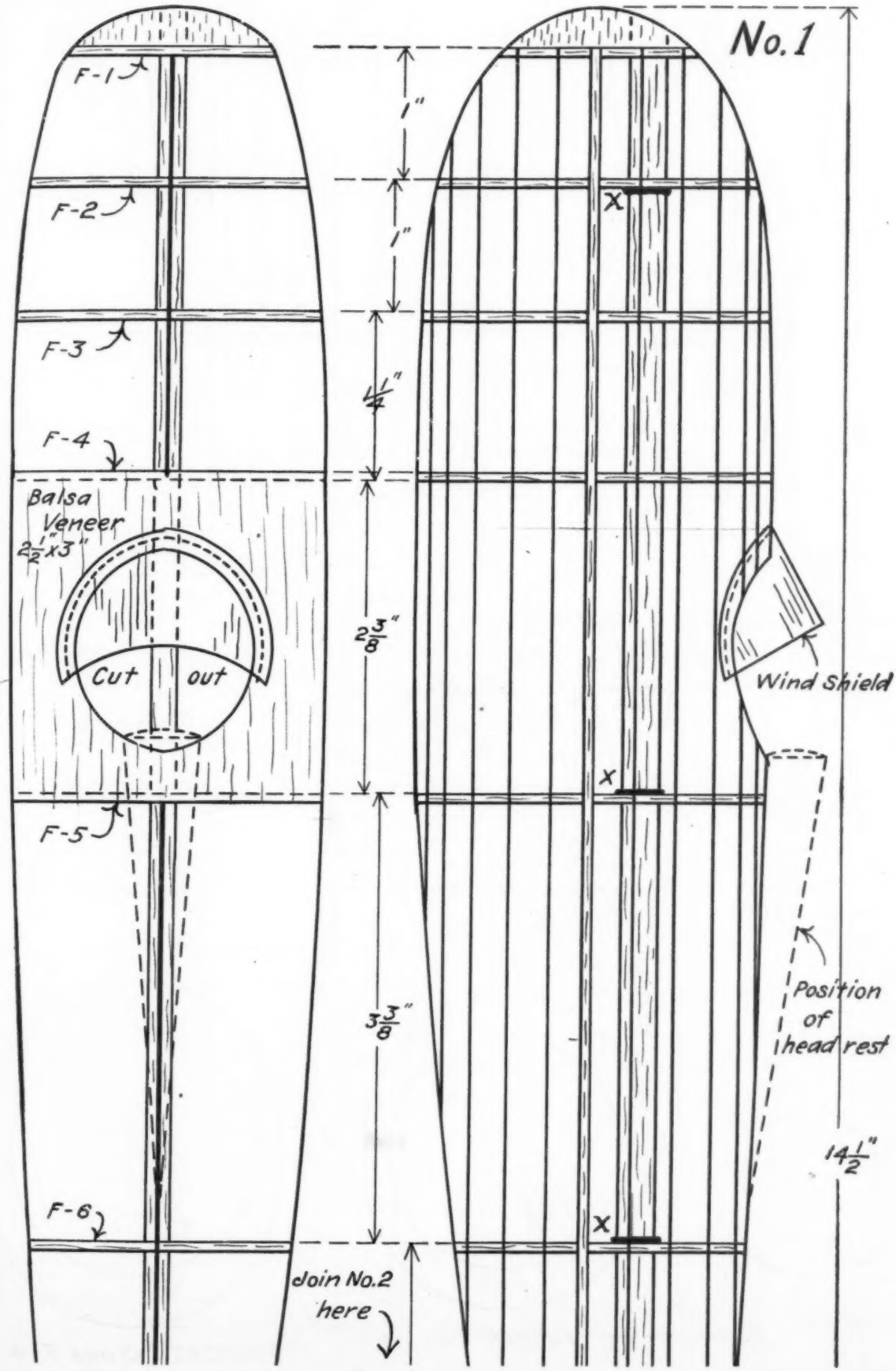
The landing gear is made of 1/8" x 1/4" balsa, except the brace designated as "A" which is made from the 1/8" x 3/4" x 3-1/2" piece of balsa, and cut to shape as shown in the drawing. Braces C and D are made and placed as shown in the drawing on the inner ribs at the fuselage. Braces A and B are then fastened with ambroid from the bottom of the "V" to the upper end of brace D. The wheels are then mounted on pins with a small bead on each side of the wheel. Push the pins through the braces at the lower end and fasten with ambroid.

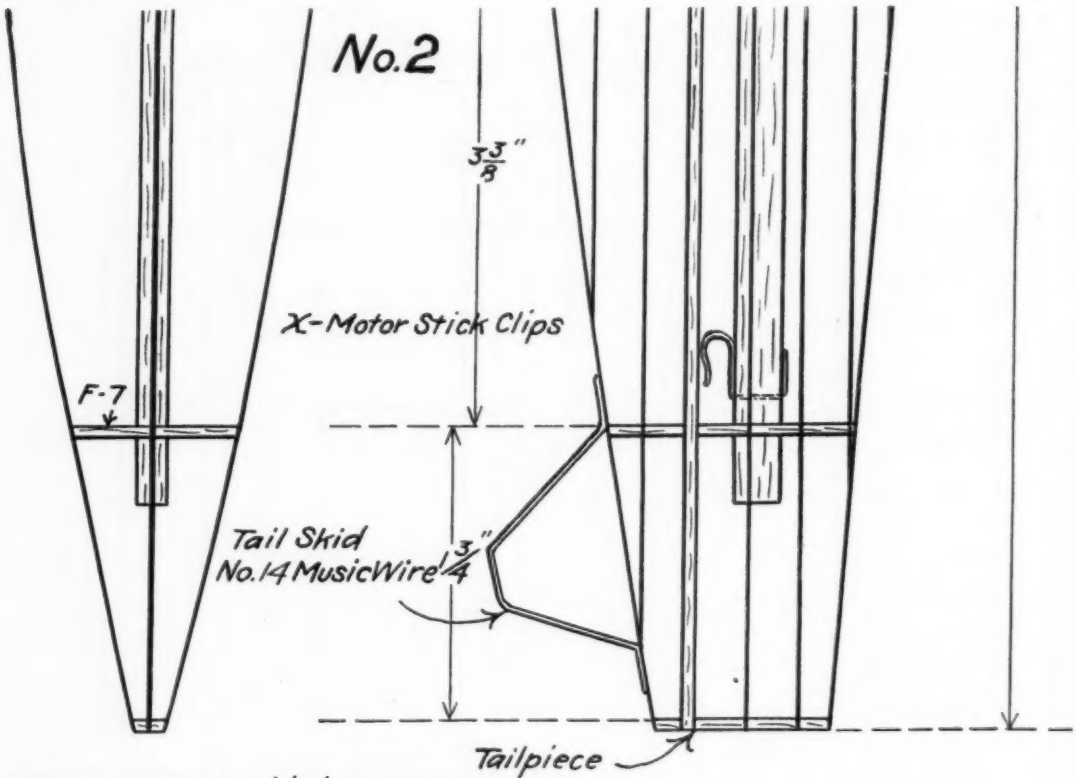
Covering

The whole plane is now covered with Japanese silk tissue. This covering must be put on neatly. Banana oil or paste may be used for fastening the tissue to the framework. After the ship has been completely covered it must be given a coat of dope so that the tissue will tighten. Never use colored dope when building any model that requires tissue covering, unless a primer of thin dope is first put on.

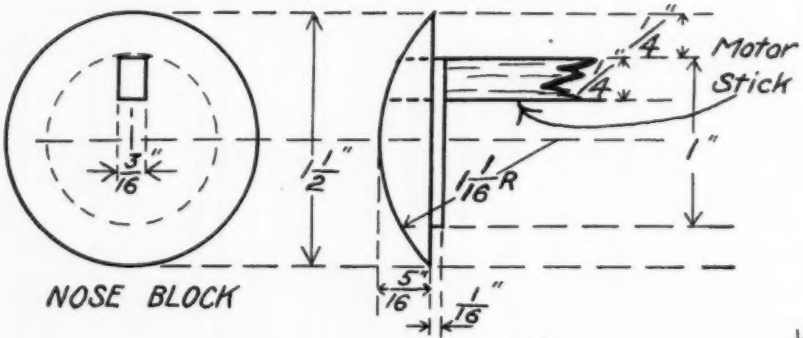
Propeller

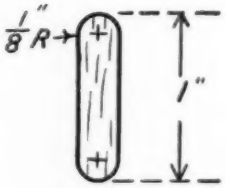
The propeller is carved from the balsa block, 9/16" x 1-3/16" x 8", and should be marked and carved as shown in the drawing. The propeller shaft is made from number 14 music wire and bent to shape as shown with the aid of a pair of round-nosed pliers. After the hook is shaped correctly it may be inserted through the propeller at the center point which is called the propeller hub. The straight end is then (*Continued on page* 62)

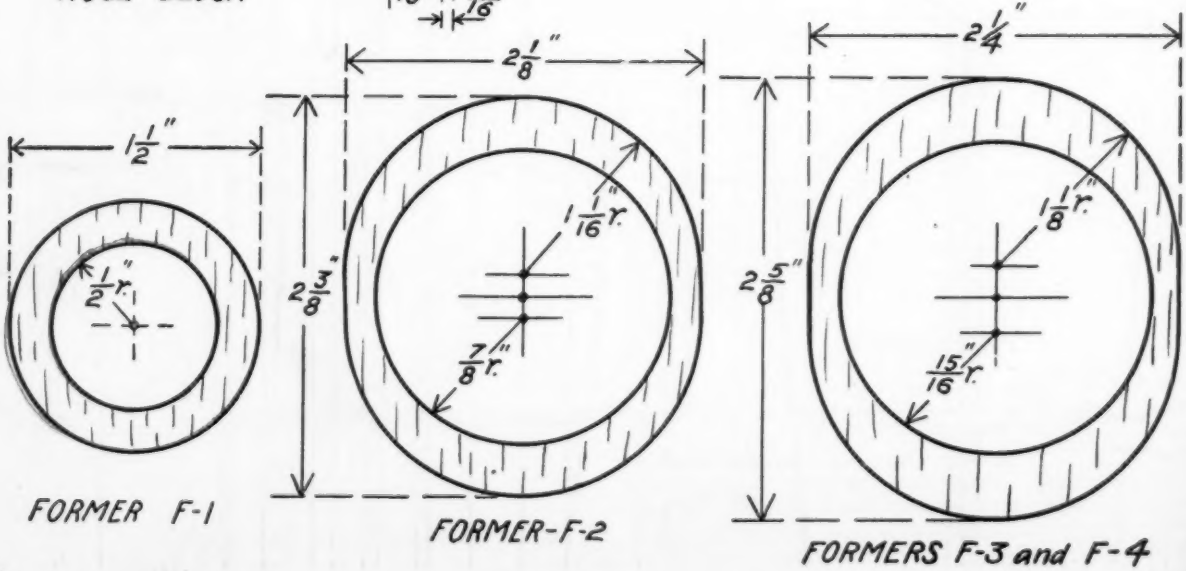

No. 1
F-1
F-2
F-3
F-4
F-5
F-6
1"
1"
1 1/4"
2 3/8"
3 3/8"
Balsa Veneer 2 1/2" x 3"
Cut out
X
X
X
Wind Shield
Position of head rest
14 1/2"
Join No. 2 here

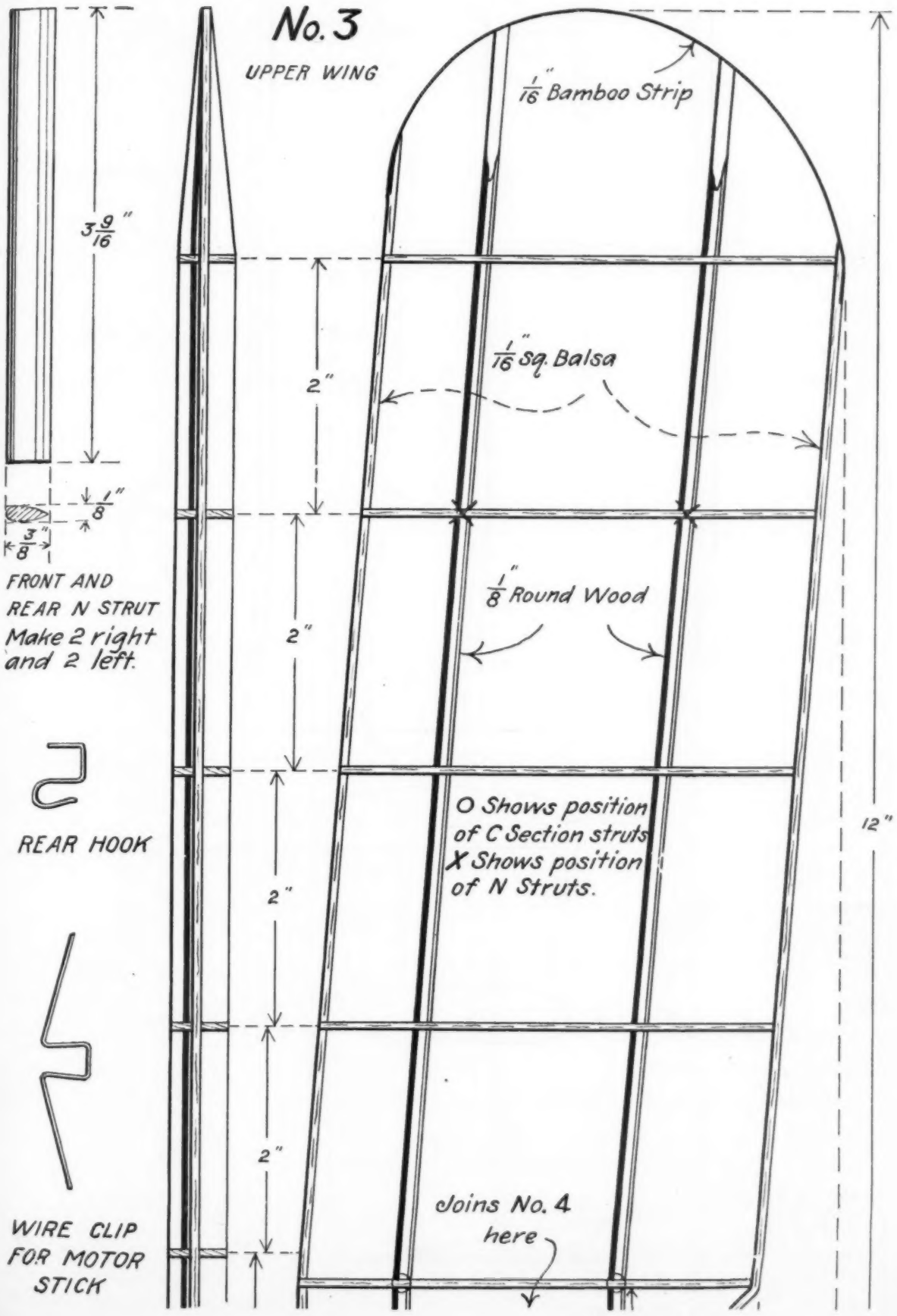


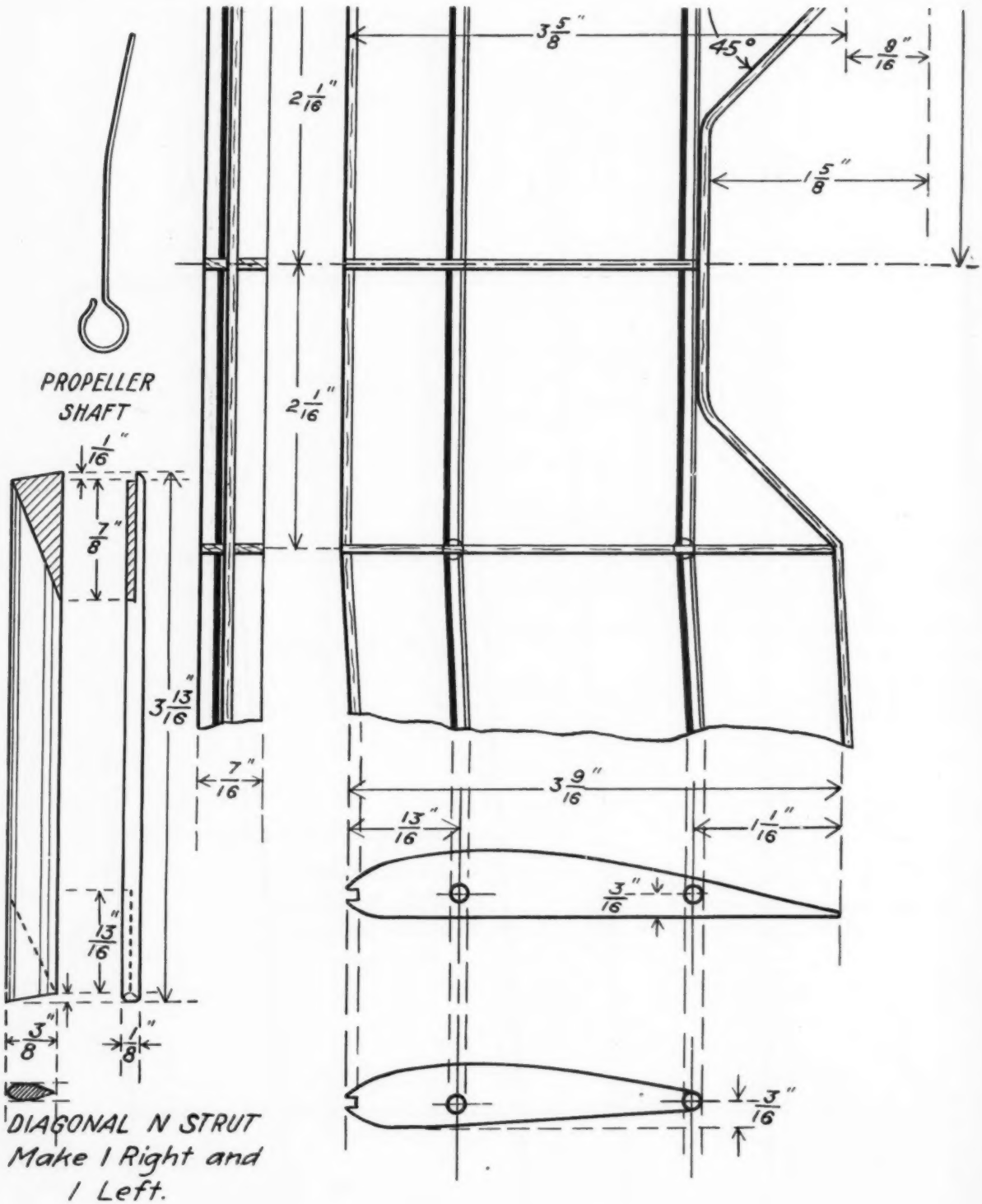
Top, Bottom and two side longerons made of bamboo. All others of 1/32" Balsa.

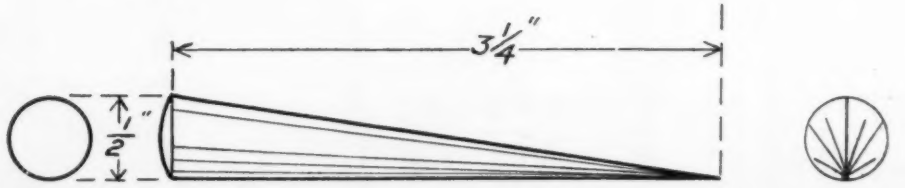






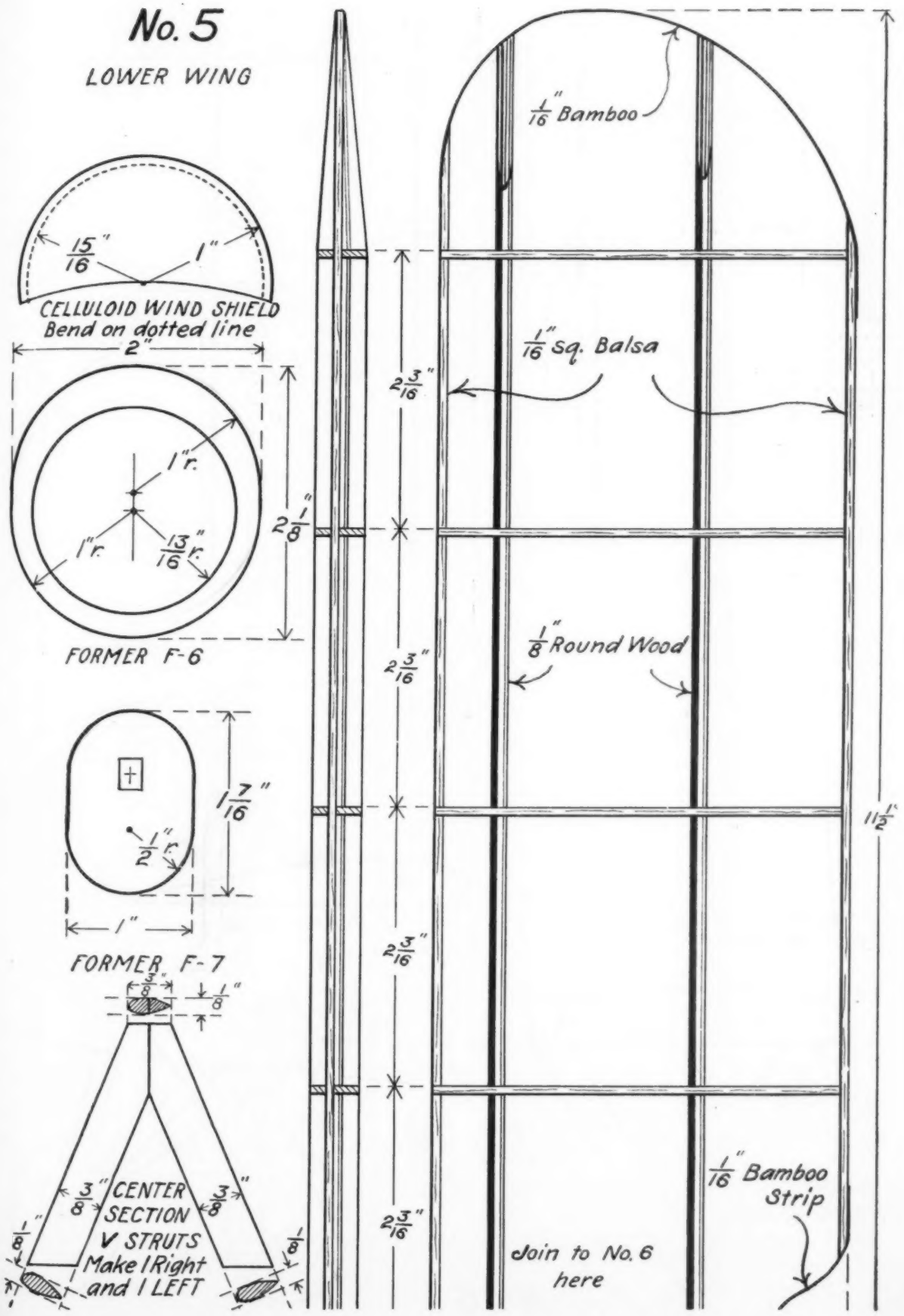

No. 3
UPPER WING
1/16" Bamboo Strip
1/16" Sq. Balsa
1/8" Round Wood
3 9/16"
1/8"
3/8"
2"
2"
2"
2"
12"
FRONT AND REAR N STRUT
Make 2 right and 2 left.
REAR HOOK
WIRE CLIP FOR MOTOR STICK
O Shows position of C Section struts
X Shows position of N Struts.
Joins No. 4 here

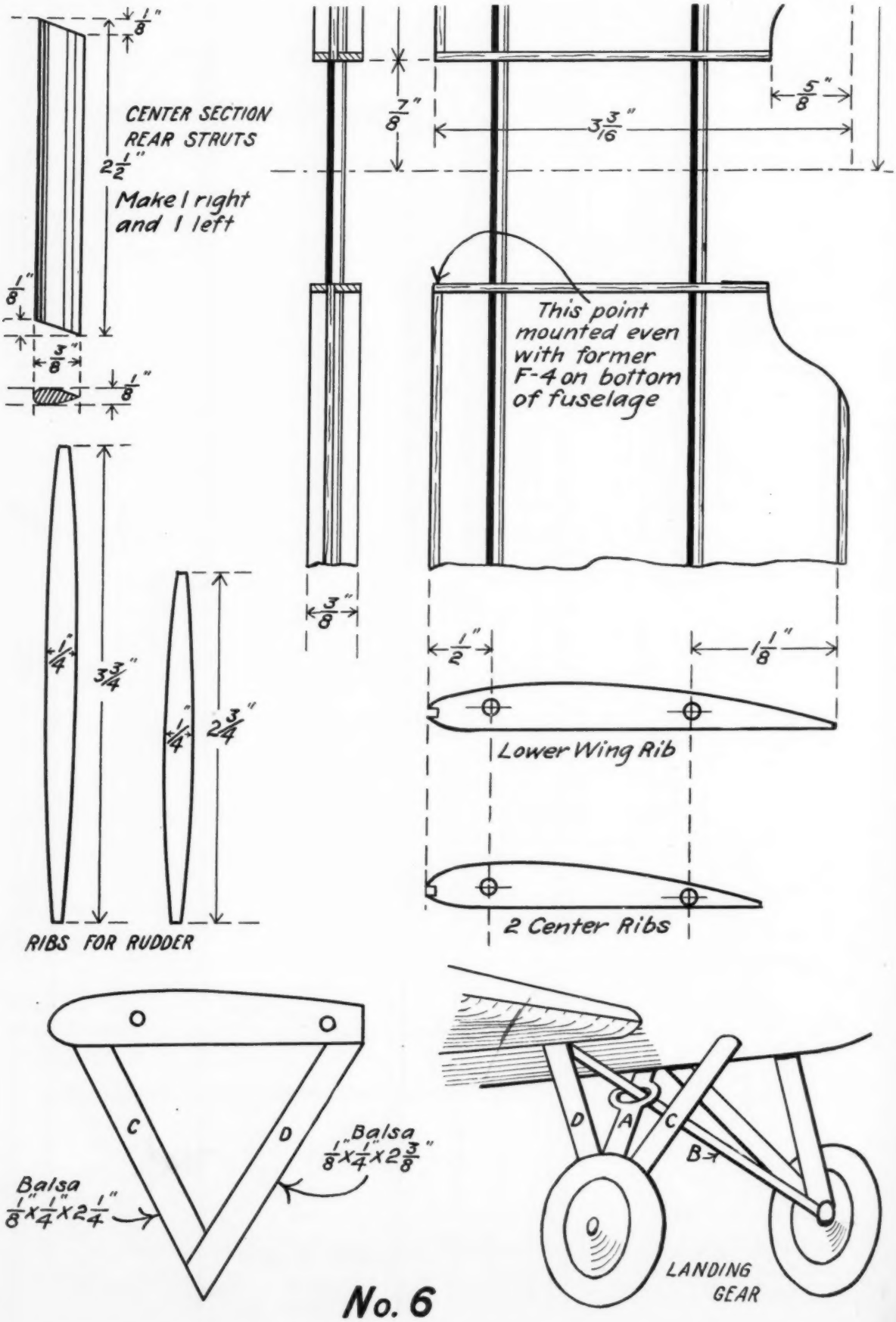




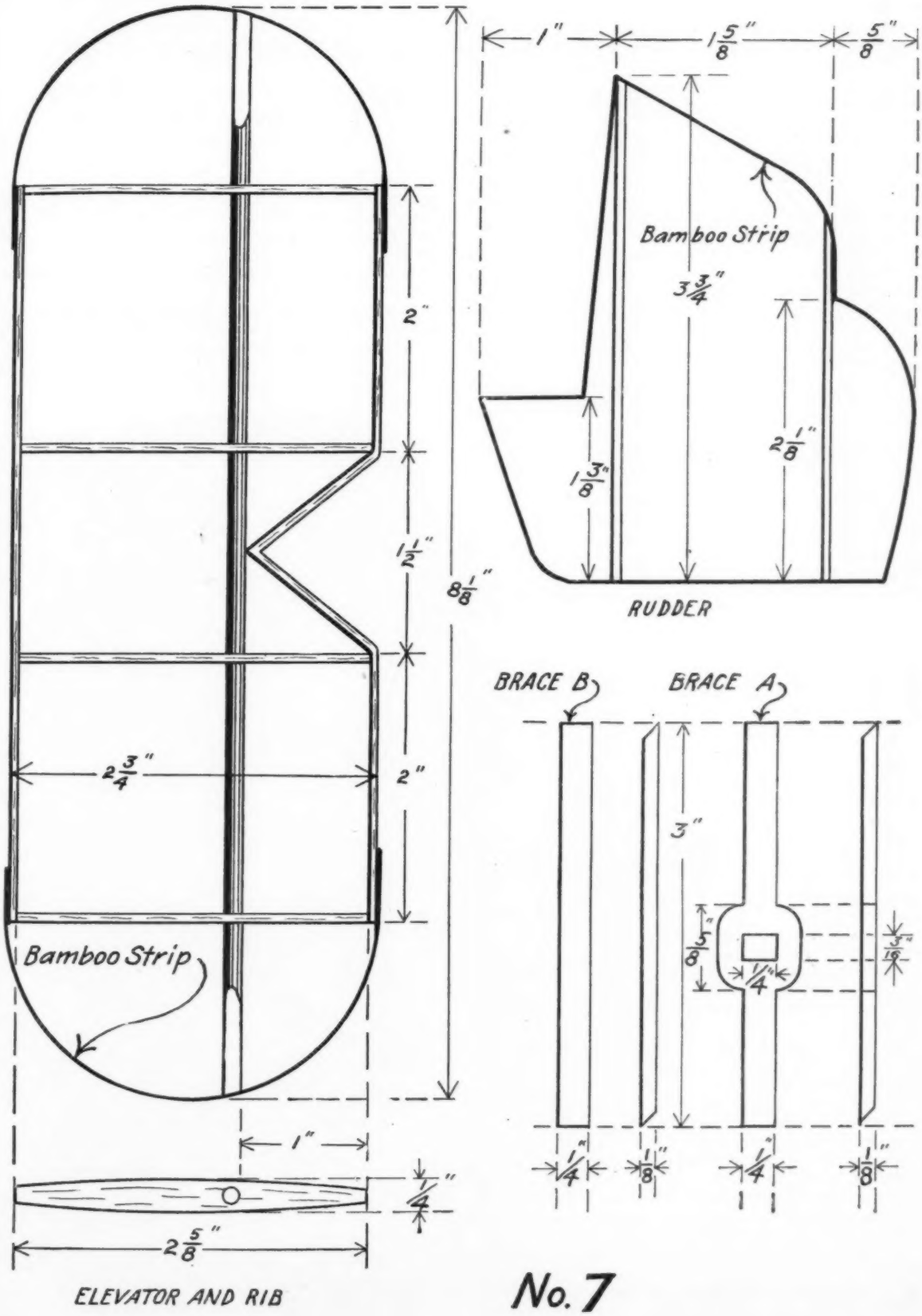
HEAD REST

No. 4


No. 5
LOWER WING
15/16"
1"
CELLULOID WIND SHIELD
Bend on dotted line
2"
1" r.
1" r.
13/16" r.
2 1/8"
FORMER F-6
1 7/16"
1/2" r.
1"
FORMER F-7
3/8"
1/8"
3/8" CENTER SECTION 3/8"
V STRUTS
Make 1 Right and 1 LEFT
1/8"
1/8"
1/16" Bamboo
1/16" sq. Balsa
2 3/16"
1/8" Round Wood
2 3/16"
2 3/16"
2 3/16"
11 1/2"
1/16" Bamboo Strip
Join to No. 6 here


1/8"
CENTER SECTION REAR STRUTS
2 1/2"
Make 1 right and 1 left
1/8"
3/8"
1/8"
7/8"
3 3/16"
5/8"
This point mounted even with former F-4 on bottom of fuselage
3/8"
1/2"
1 1/8"
Lower Wing Rib
2 Center Ribs
1/4"
3 3/4"
1/4"
2 3/4"
RIBS FOR RUDDER
C
D
Balsa 1/8" x 1/4" x 2 3/8"
Balsa 1/8" x 1/4" x 2 1/4"
D
A
C
B
LANDING GEAR

No. 6


1"
1 5/8"
5/8"
Bamboo Strip
3 3/4"
2"
1 1/2"
8 1/8"
2 1/8"
1 3/8"
RUDDER
BRACE B
BRACE A
2 3/4"
2"
3"
Bamboo Strip
1"
1/4"
2 5/8"
ELEVATOR AND RIB

No. 7

The Avenger

By

LAURENCE DONOVAN

DAN CARTER secures a position as stunt flyer for the Dawnart Films and when the company decides to shoot a war picture, Boomer Valley is selected for location. This is where Dan Carter was born and it is his father's ranch the film company camps on.

When Dan reaches home, he find his father in trouble and tries to solve his difficulties. He goes to the town of Crosscut and gets in a fight over another boy, Tom Calloway. They are both arrested and Dan is fined $500 by Simons, the mayor, who is also the judge. Tom does not reveal his sentence. That night Dan breaks jail but Tom refuses to go with him. Later Dan hears Simons force Tom to blow up the bank as his price of freedom.

After the explosion Dan makes for his plane and discovers Tom being pursued by a posse led by Simons. Dan rescues Tom and takes him to Minion Mesa.

The next day they start to shoot the picture and a new flyer, Harvey, forces Dan into a tailspin. Dan comes out of it all right but with the feeling that it was no accident. Later, when staging another battle in the air, some one fires on Dan with a rifle. He maneuvers his plane so that he can get the general direction from which the shot came within range of his own gun and fires. He kills Harvey.

When he lands the sheriff arrests Dan for murder and he is off to jail once more. Dan manages to escape again and, meeting Simons on the street, takes him prisoner. Dan forces Simons in his plane and takes him to Tom on Minion Mesa, considering him safe there.

He then turns his attention to the Mexicans, who are preparing to drive off a herd of his father's cattle. Dan has a fight with them and Tom, absorbed in watching it, forgets about Simons. The latter seizes his opportunity, slugs Tom and takes Dan by surprise, forcing him to the edge of the precipice with a rifle at his back. Just as he reaches the edge, Dan suddenly jumps aside.

DAN swung around facing Simons. The point of the rifle was within two feet of his breast. Simons, eyes narrowed to points, the lust of the killer in his face, pulled the trigger.

Dan stood smiling calmly while the hammer clicked. Frantically the mayor dragged at the trigger again. Once more the hammer fell on an empty chamber. Then Dan swept the gun aside with one lightning bound, drove his fist into the mayor's face and finished the job by tearing the rifle from Simons' grip.

Simons staggered, slipped to his knees, bewilderment and fright in his eyes.

"The next time pick a gun that's loaded," advised Dan. "Now hump yourself over to the plane and don't make one move sideways or I'll hit you properly."

When Dan had started to walk toward the precipice with the mayor's gun in his back, he had glanced at the limp figure of Tom. He had seen that Tom's rifle had fallen under his body. There was only one other rifle on the mesa, and Dan knew it was the empty gun he had thrown behind him when the last shell in the magazine had been fired at the Mexicans.

Tom was moving, getting to his feet. A lump showed over his right eye where Simons had hit him. He ran towards Tom, his hands outstretched.

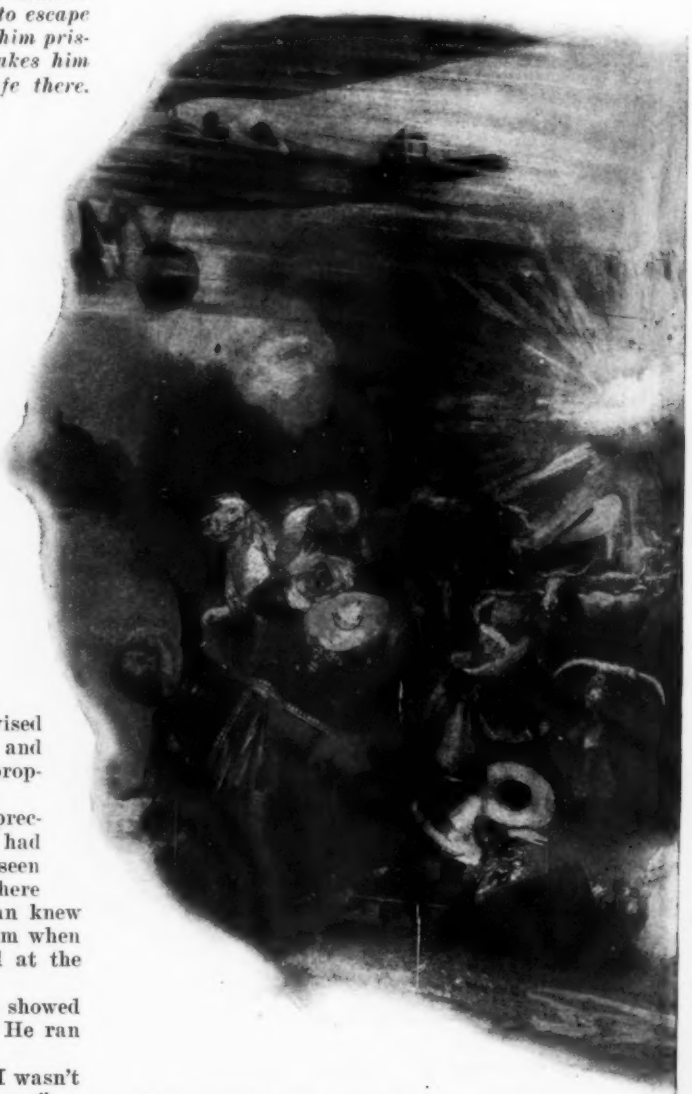
"He—he got me when that Mexican came up. I wasn't looking—if he'd got you, I'd a jumped over. I'd——"

And Dan, looking into Tom's face knew that he meant it. More than ever Dan resolved that this boy Tom was going to have a really good chance to get well.

Simons had fallen silent again. The dazed expression that empty rifle caused had not gone out of his eyes. Dan fastened the straps around him in the second cockpit.

"And man, how you're goin' to need 'em," muttered Dan, half to himself.

"You can wind the prop for me," he told Tom, "and then you take the guns and camp at the head of that trail. Don't think you'll be bothered by that gang of Greasers again, but unless it's a white man, shoot the



Dan's attack caused confusion and a stampede

from the Skies

All's Well that Ends Well— and Dan Comes Through with Colors Flying

first one that pokes his nose around that rock."

Dan looked to the trigger releases for the double row of smoke bombs in the rack under the "Eagle Longhorn." Simons cringed when he tested the Vickers with a burst from the belt of "fire" bullets.

"Contact," yelled Dan.

Tom spun the propeller and sprang back from its gleaming whirl. He gathered up the rifles, both now loaded, and waited while Dan revved up, braked one wheel and swung the plane around. Tom made has way to the top of the trail and Dan, glancing at him, was sure that the trail would be a hot place for any Mexican who took a chance on coming up. Tom would see to that.

Dan pulled the stick, tipped his ailerons and went spiralling for altitude. On the swing the Dawnart camp came into his horizon. What was that? Yes, two of the company planes, the Fokker and one of the camera planes were in the air. They must have taken off when he had been seen to rise from the mesa. And they were climbing, heading his way.

At a thousand feet over the mesa, Dan banked and laid a course across the canyon. When he was on the other side, he abruptly reversed the order of the upward spiral, closing the throttle and gliding down. From up there the Mexican shack looked like a tiny toy house. Soon it grew larger and Dan could see that the Mexicans were bunching the longhorns for the drive through the narrow defile leading out of the canyon to the border trail.

The appearance of the plane overhead evidently threw some of the Mexican riders into a panic. Dan saw them dashing in all directions on their horses, driving stray steers back into the milling herd. But ten or a dozen Mexicans were grouped close around the shack, putting the finishing touches to the packs on the horses that were ready to go out.

To Simons in the rear cockpit, it must have looked like Dan was planning to dive straight into the wall back of the Mexican shack. Dan brought the plane out of the spiral, gave the motor the gun and swooped downward. When he was only a short distance from the wall of the mesa, Dan banked vertically, straightened and at a height of only about 200 feet glided over the shack.

Dark faces were uplifted. Two or three rifles started talking. A bullet zipped through the bottom of the fuselage and out through the top. But a plane travelling at more than 200 feet a second is not an easy target.

Dan pulled the bomb rack release cord. Once, twice, three times. Smoke bombs are not designed to do a great amount of damage. But the detonations were terrific there in the closed canyon. The explosions were forceful enough to shatter the roof and walls of the Mexican shack. Flying boards and splinters showered around the rustlers. One bomb struck outside the shack, hurling three or four of the rustlers from their feet.

Dan had to wait until he had zoomed out of the momentary stall necessary for dropping the bombs, before he could bring the plane into position to see what had happened. He grinned as he watched the ensuing panic. Running blindly, colliding with the

terrified longhorns, some of the rustlers had dropped everything in their haste to remove themselves from the vicinity of the shack. Others were clinging to the frightened pack-horses, some of which were rearing and plunging, while others were running away, scattering the contents of their panniers along the ground.

Dan climbed again, just enough to clear the farther rim of the canyon, then he came back. This time he let go half a dozen bombs as nearly on the heels of the panic - stricken rustlers as he could place them. One of the bombs, striking in the edge of the longhorn herd, started the maddened cattle dashing wildly in all directions.

On his third climb over the rim, Dan glimpsed the planes from the Dawnart camp. They were held at a couple of thousand feet above the canyon. Dan thought at the time that some of his fellow flyers were merely watching him. He volplaned for the third time, letting go the last of the smoke bombs. The canyon had become an inferno of tossing horns, plunging horses and scattering rustlers. The thick black smoke from the bombs lay like a cloud against the mesa wall.

His trick had worked; Dan's pursuer went on down

"Guess that'll hold them for a few minutes," muttered Dan, banking and zooming out of his glide.

He glanced over his shoulder at Simons. And as he did he saw the mayor's hand upraised, waving madly.

Having had his attention centered on the canyon and the dropping of the bombs, Dan had not been watching the Dawnart planes. Now he saw that the Fokker had volplaned until it was paralleling the "Eagle Longhorn." He saw a hand upraised over the edge of the second cockpit in response to the mayor's signal.

Dan slowed his motor. The Fokker flashed alongside. Then Dan knew the worst. He had a brief view of Sheriff Dozer's face and saw his hand come over the edge of the cockpit holding a gun. But now the mayor was waving a frantic hand. He wanted to be sure that his sheriff knew he was in Dan's plane.

Dan chuckled. At least there would be no shooting while the mayor was a hostage. Also, as long as the "Eagle Longhorn" was in the air, there did not seem much that the sheriff could do about it. And Dan had no intention of setting his wheels on the ground again until he had completed the job he had set out to do.

He gave the motor the gun and zoomed for altitude. He had seen that none of the Dawnart men were at the stick of the Fokker. When he had gained speed enough, he banked and cut almost vertically across the nose of the Fokker. Sure enough, he had guessed right. The sheriff's pilot had not been at the controls for some time. Dan saw the Fokker go into a stall and drop into a spin.

The Fokker came out of it quickly, but Dan knew he had given the sheriff a bad half minute. Then the Fokker straightened out and glided toward the mesa. Dan groaned. Tom was there and just now he could not help him. There was no way Dan could get back to him.

Anyway, figured Dan, it would not make any difference now. The sheriff could hardly do more than take Tom into custody. Dan hoped that the boy would make no resistance. But to make sure, he circled and watched the Fokker land. He saw the Sheriff meet Tom and take his gun. He had idled his motor for a few seconds, and from down below he heard the roar of moving cattle.

The sheriff's Fokker was in the air again. Then the camera plane came streaking down, crossing the "Eagle Longhorn's" nose. Dan recognized Sanderson's uplifted hand. He judged that it was a sheriff's deputy in the rear cockpit.

Dan glanced at his gas gauge. He had enough reserve fuel for another nine hours in the air if he took it easy. The Fokker had no reserve tank. Four hours in the air was its limit.

The three planes' props thundered across the sky. And below them the hoofs of a thousand longhorns thundered on the hard-packed earth of the border trail.

HERE was drama. An hour ago there had been tragedy and running through it all was plenty of comedy, if you had the mind to see it. Sheriff Dozer and his futile air posse, and Simons, the "brains" of a plot to seize a valley, rule a town, rob the ranges, hunched back there in the cockpit, a bundle of helpless fear.

Why, instead of the cameras being cranked on a mimic war in which the chosen "hero" stayed safely on the ground, here was flashing action that probably never would be repeated, not in a lifetime. With his mind whirling with these thoughts, Dan laughed aloud, a shout of wild merriment that sent Simons crouching lower down in his seat in the belief that his captor had suddenly gone mad.

But the thoughts were swept away suddenly. The first animals of the longhorn herd had strung out of the canyon. Hedged in by the Mexican riders, the herd was turned toward the south. At the same instant that Dan observed the movement (*Continued on page* 44)

How to Build a Non-Flying Scale Model of the Graf Zeppelin

An Excellent Replica of the Airship Which Added a Page to History by Circling the Globe

NO doubt, most of our model builders would like to make a scale model of the Graf Zeppelin and add it to their collections.

Care and patience must be taken in constructing the Zeppelin. Before getting to work, let us look over the drawings. Study the dimensions, note the streamlined shape of the ship and the attachment of the gondolas. Look over the materials you have before you.

Formers

From a piece of sheet balsa 1/16″ x 6″ x 36″ trace from the drawings all the formers. Shown on drawing by dotted lines. Use a sharp knife or a razor to cut the formers to shape. After all are made, mark them into sixteen parts as shown.

After you have completed this, take sixteen strips of balsa 1/16″ x 1/2″ x 36″ and taper to shape of center strip as shown in drawing. Then soak them in hot water for a half hour. Now take one of them and place your first former A, which is a big one, 10 1/8 inches from front end. Ambroid the strip on the former with center of strip on one of the sixteen lines and push a pin through it. The same is done with another strip on the bottom of the former A. While the wood is still flexible, take the next former, which is former B, pin and ambroid in proper position. Now take former C and do the same.

Be sure to space the formers the correct distance apart, as shown in the drawing. Now take former D, pin and ambroid it. Do the same with former E. Get two more strips of balsa 1/16″ x 1/2″ x 36″ and string them in position. Now take all these four strips and pin and ambroid to formers F and G. Allow the built up frame to dry for an hour and a half. Keep the other strips in warm water meanwhile.

Necessary Materials

1 sheet	1/12" x 6" x 36"	balsa	formers
18 strips	1/16" x 3/8" x 36"	balsa	stringers and braces
1 block	2-1/4" x 3/4" x 3-1/2"	balsa	control car
1 piece	1/16" x 4" x 16"	balsa	tail surfaces
1 block	1-1/4" x 1-1/4" x 1"	balsa	bullet nose
1 strip	3/8" x 3/8" x 12"	balsa	motors
1 strip	1/16" x 1/16" x 12"	balsa	propellers
1 strip	1/8" x 1/4" x 15"	bamboo	motor braces
2 sheets		Japanese tissue	covering
1	two ounce bottle	ambroid	gluing wood
1 tube		David's paste	pasting tissue
1 package	model making	pins	building
1	two ounce bottle	dope	doping
1	two ounce bottle spec. silver	dope	
1	1/2 ounce bottle black	dope	
1	1/2 ounce bottle white	dope	

See Plans on Pages 20 to 22

Tail Surfaces

During the drying process, a number of other things can be done. From the piece of balsa 1/16″ x 8″ x 8″, trace from the drawings the shape of the fins and cut them out. Streamline as much as possible. Set them aside. From the piece of balsa 3/8″ square, cut and shape out the five motors. Set them aside. You can also shape out the control cabin as shown in the drawing.

By this time, the body should be thoroughly dry. Now start from former E and begin placing the stringer strips (1/16″ x 1/2″ x 36″). Pin and ambroid. Be sure to get them well rounded and streamlined. After you have all the stringers to shape, set aside to dry. This completes the framework.

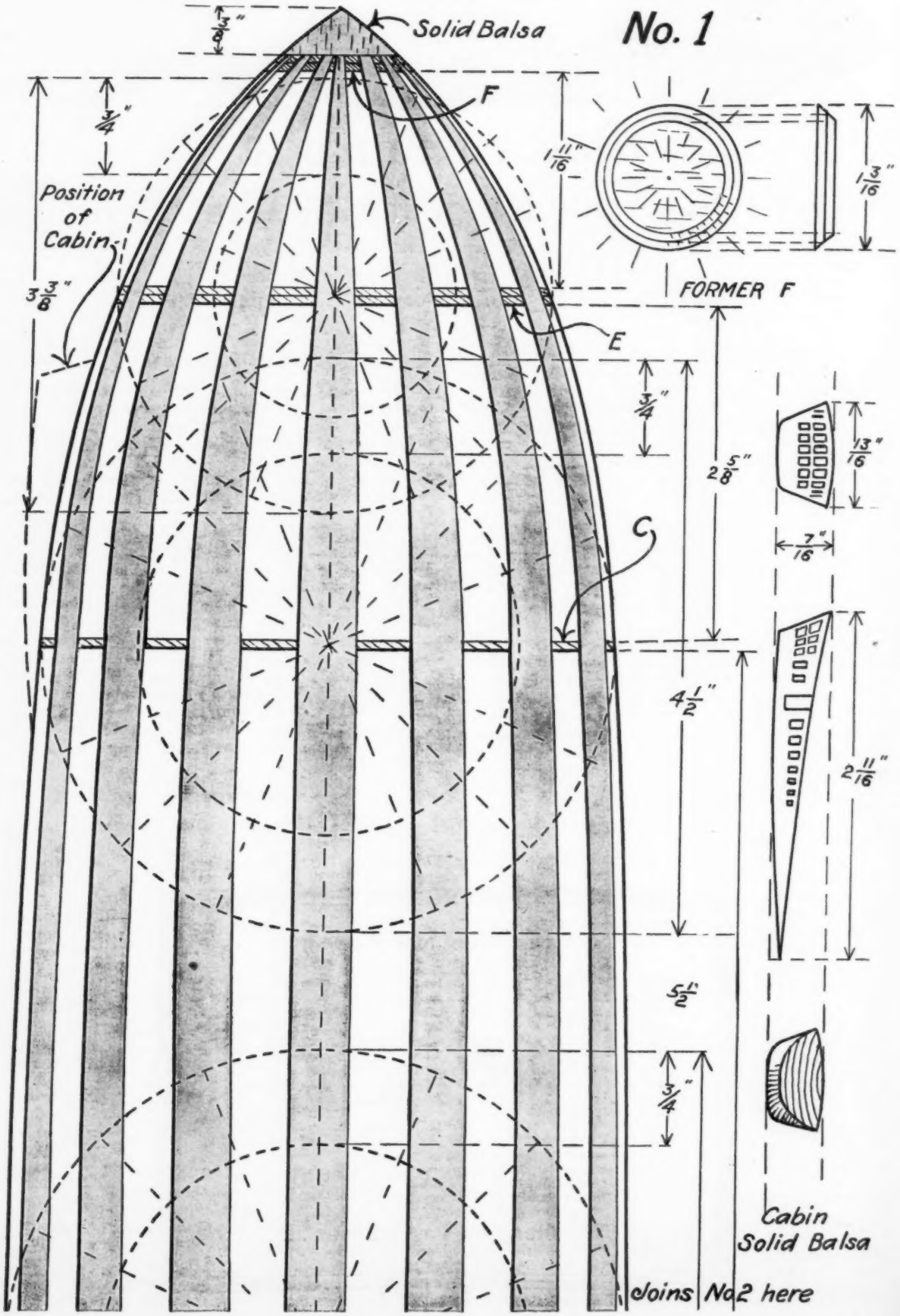
Now take the two blocks of balsa for tail end and nose end; 1-1/4″ x 1-1/4″ x 1″ for the nose and 2″ x 2″ x 2-1/4″ for the tail. Shape these as shown in drawing. Smooth with sandpaper and ambroid one at a time in position as shown in drawings. Set aside to dry thoroughly. Then run over the Zeppelin frame with smooth sandpaper, take out all the bumps and see that nothing is loose.

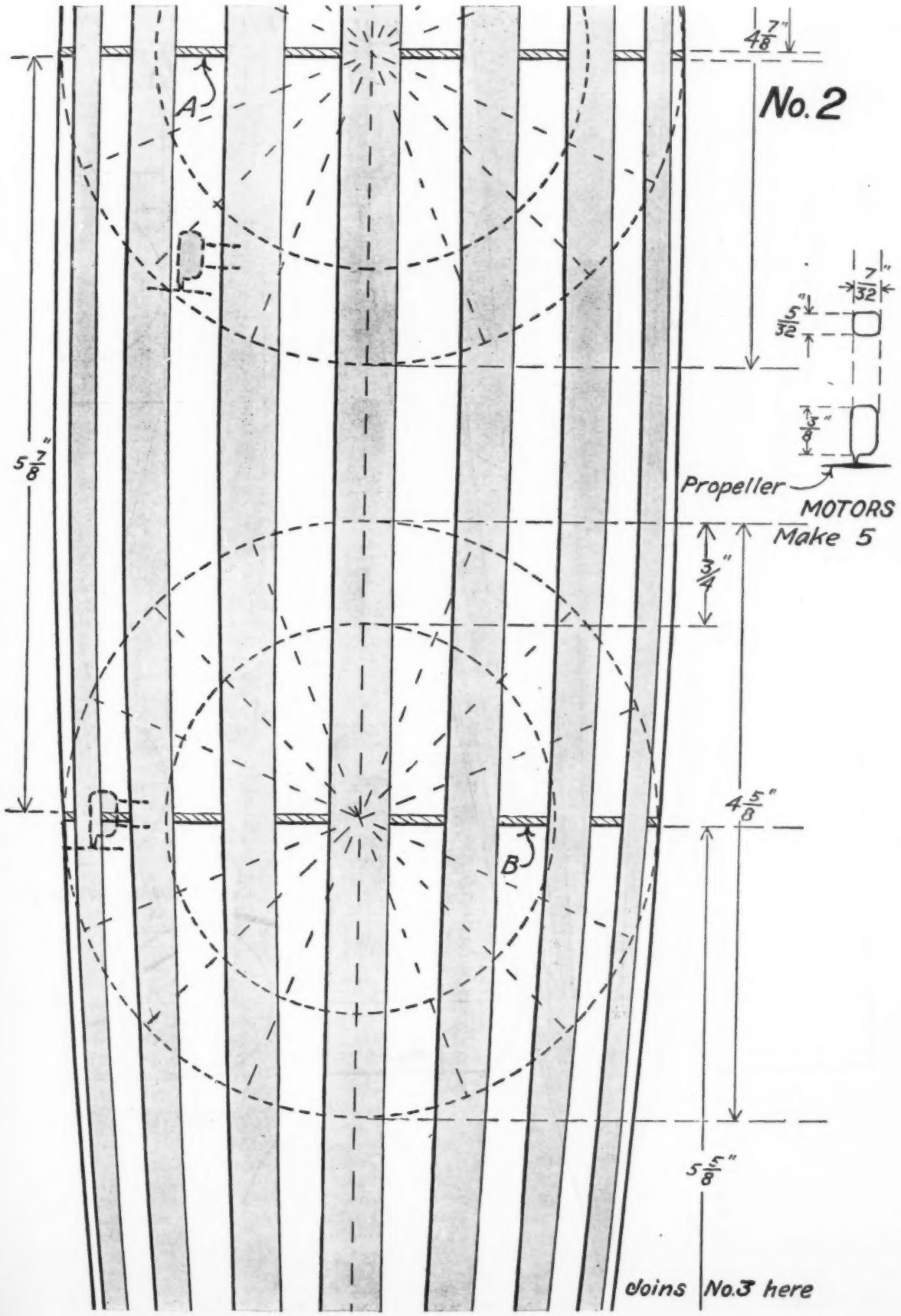
Covering

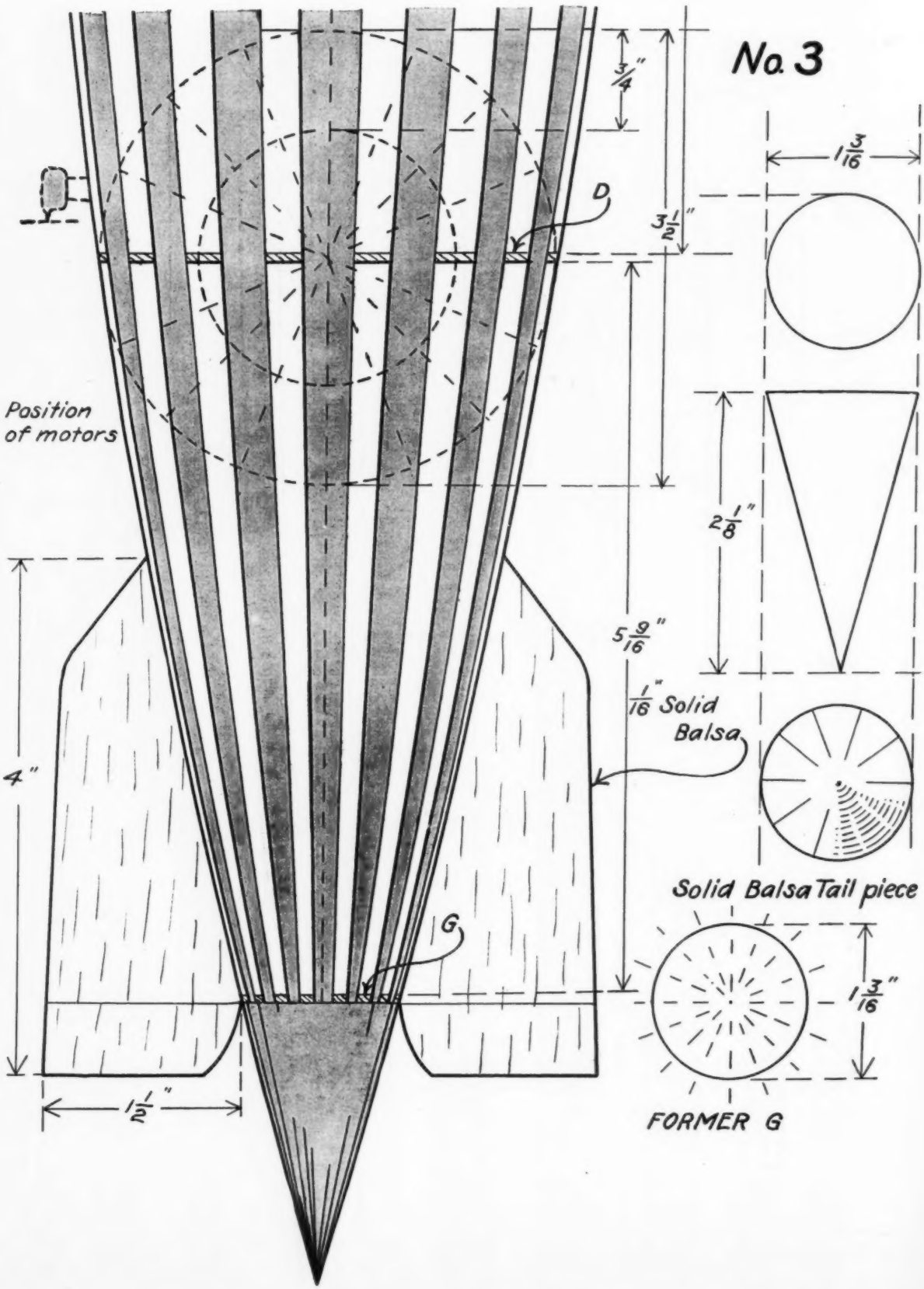
Use David's paste for pasting. Cover the Zeppelin with the Japanese tissue, covering in sections and pulling the paper very tight. After the covering is complete, ambroid the fins in their positions, one at a time. Be sure they are straight and upright. Then ambroid securely the control car in its proper place, allowing one hour to dry.

Now attach the motors. Use the strip of bamboo, stripping it up and attaching motors to the Zeppelin as shown in drawing. From the strip of 1/16″ x

(*Continued on page 49*)

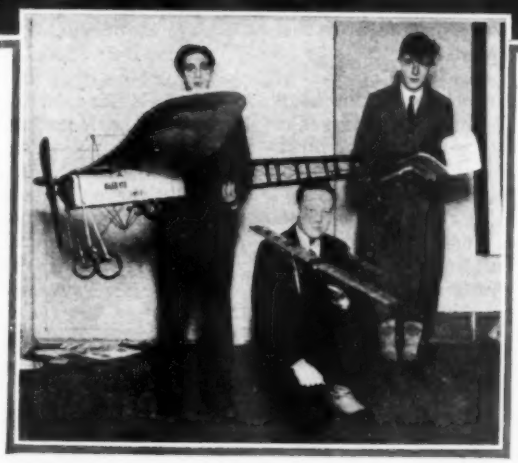

No. 1
Solid Balsa
3/8"
F
3/4"
Position of Cabin
3 3/8"
1 11/16"
1 3/16"
FORMER F
E
3/4"
2 5/8"
1 13/16"
7/16"
G
4 1/2"
2 11/16"
5 1/2"
3/4"
Cabin Solid Balsa
Joins No2 here


4 7/8"
No. 2
A
7/32"
5/32"
3/8"
5 7/8"
Propeller
MOTORS
Make 5
3/4"
4 5/8"
B
5 5/8"
Joins No. 3 here


No. 3
3/4"
3 1/2"
1 3/16
D
Position of motors
2 1/8"
5 9/16"
1/16" Solid Balsa
4"
Solid Balsa Tail piece
G
1 3/16"
1 1/2"
FORMER G

The American Sky Cadets

Full Report of Winners and Activities at the N Y. Air Show



Commander Gilmartin of the American Legion is seen (top) awarding prizes to the winners of the glider contests. The lower picture shows (left) Morton Nussbaum, 1457 Wilkins Ave., Bronx, N. Y. and Alexander Dallas, 16 Ross Ave., New Dorp, S. I., holding a Bleriot monoplane model and (kneeling) Harold C. Henderson, 58 W. 83rd St., N. Y. C., with a Curtiss Robin model. All models were exhibited at the New York Aviation Show

News Events

GREAT promise for the future of aviation was forecast by Aviators Post No. 743, American Legion, as the result of the active interest in the model planes on the part of the thousands of girls and boys of the city at the recent aeronautical exposition of the war flyers at the Grand Central Palace, in New York City.

Hundreds of model planes and gliders, both non-scale and flying-scale, made it hard for the judges to pick out the winners. There were models of every plane and glider now being manufactured and were of every size and color. One section of the floor resembled a miniature airdrome.

One of the most interesting models entered was a scale model, twenty-four-inch wing spread, Curtiss Army Hawk, built by Alexander Dallas, sixteen years of age of 16 Ross Avenue, New Dorp, Staten Island, and it won first prize, a $250 silver cup presented by the National Exchange Club and a complete engineering course at the Institute of Aeronautics.

The plane has movable controls, shock absorbing landing gear, swivel shock absorbing tail skid, removable fire extinguisher, removable belly tank, miniature throttle, steps in the fuselage, machine guns and trigger, shutter control and exhaust pipes, wheel for stabilizer, flooring as in the original plane and an instrument board.

It took eleven and one-half months to build and last year won first prize at the same show.

Percival Gayle, a nineteen-year-old colored model enthusiast who lives at 57 East 111th Street, was too late to enter his model of a Fairchild 71 cabin monoplane built to scale, but he received a special prize of a ground course at Roosevelt Field and a book entitled Modern Aircraft.

His model is of the twenty-four-inch wing spread type and caused much comment for its many features and little details that are only thought of in the building of a real plane.

The model has folding wings, full set of movable controls, wing landing lights controlled from the pilot's compartment, dummy flight lights, cabin and dashboard lights, instruments on the dash in same position as in original, shock absorbing landing gear, swivel shock absorbing tail skid, upholstered seats and there were five individual and one double seats, velvet lined cabin and floor carpet, two small flashlight batteries for lighting, two cabin doors one of which operated the lights, adjustable windows. The engine control also operated the lights which can be dimmed or brightened.

THE engine was built to scale of a nine cylinder Wasp with two exhausts. The mufflers are split like the original for the purpose of letting the unburned gases escape. It has a laminated propeller of three pieces of wood, two of gumwood and one white holly. It has an adjustable stabilizer and is colored orange, yellow and blue.

Percival had on exhibition, but not in any contest, a model of a Macchi 52 which is an Italian racing seaplane. It has a wing spread of thirty-one inches weighs six ounces and will take off from the water, fly at an altitude of three feet and cover the distance of three hundred feet in six or seven seconds, or an approximate speed of forty miles an hour.

The ship however will not go farther than the impetus given by the rubber bands, used for the motor. These are wound up to not more than four hundred and fifty turns, which is sufficient to give the ship a flight of three hundred feet. The sister ship of this model was sent to Italy last year and is in the factory of the concern that manufactures the original.

First prize for construction set flying scale models

was won by a Curtiss Hawk and was built by American Sky Cadet Morton Nussbaum, sixteen years of age, of 1457 Wilkens Avenue, Bronx. The plane is a duplicate of the scale model which won first prize.

Dante Algeri, nineteen years of age, of 225 Van Sicklen Avenue, Brooklyn, entered a scale model of the Flying Dutchman in the twenty-four-inch wing spread contest and it carried off third place.

It is correct in every detail having been carefully copied from the original which is a small monoplane and seats only the pilot. The model is painted black with the motor, ailerons, elevators and rudder done in black and white check.

The model has a three cylinder motor, shock absorbing landing gear, and it won third prize last year when it was entered in the contest held at Roosevelt Field, Long Island.

Dante attends New York University Aeronautical School where he is studying Aeronautical Engineering, and has drawn the plans for a Curtiss Falcon now being produced by the United States Model Aircraft Corporation.

John MacGregor, 131-22 135th St., Queens, L. I., with a model of a Curtiss Hawk U. S. Navy pursuit plane. This was one of the attractions at the aviation show

News Events

NICK TRIMARCE, eighteen years of age, of 166 Elm Street, Newark, New Jersey, entered a flying scale model of the Flying Dutchman and was awarded first prize in the form of a silver pedestal trophy mounted with a model of the "Spirit of St. Louis".

Nick stayed up two nights to build the plane so that he could get it into the contest on time. It took thirty hours of constant application to build the model he told the judges.

Another of Nick's models, a Vought Corsair, won third prize in the twenty-four-inch wing spread scale model contest. This model has twice before carried off both first and third places. The first prize was won at Islip, Long Island and the third prize was won at Central Park in the contest conducted by the New York *Evening Graphic* last year.

All the boys are either members of American Sky Cadets or the Junior Aviation League.

Any boy or girl enrolled in a Public Elementary, Junior High School, Parochial Elementary, or Junior High School, Member of a model plane club, or group participating in the contests was eligible to compete. The boys and girls were given the choice of entering the contests as an entrant from a school or as a member of one group.

The contestants were required to be in good standing in their studies and had to have their applications signed by their parents or guardians and the principal of their school or an official of the exposition.

THE list of events, and prize winners, was as follows:

(1) Gliders, hand launched. These events are for length of flight.

Class A: Boys from six to twelve years of age.

Class B: Boys over twelve years of age.

(2) Any type of rubber-motored plane, hand launched. These events are for duration of flight.

Class A-1: Models over thirteen-inch wing spread, for boys six to twelve years of age.

Class B-1: Models of thirteen-inch wing spread or less, for boys over thirteen years of age.

Class B-2: Models over thirteen-inch wing spread for boys over thirteen years of age.

(3) Scale Models. Limited to twenty-four-inch wing spread. (A scale model is a replica of a standard plane.) These events were for neatness of workmanship and accuracy of detail. These models were to be built entirely by the contestant, except for propeller bearings, small metal fittings and wheels. The model to be a replica of any standard aircraft, dirigible or blimp.

Class A: Boys from six to twelve years of age.

Class B: Boys over twelve years of age.

(4) Construction sets (putting together any construction set sold in the stores. These events judged on their neatness of workmanship and the amount of work involved in constructing the model. A model of standard tri-motored cabin plane with a thirty-six-inch wing spread required more time and skill to construct than a smaller, simpler model and, therefore, was entitled to a higher rating.

Class A: Boys from six to twelve years of age.

Class B: Boys over twelve years of age.

The elimination

Edward J. Moriarty, Assistant Administrator of the American Sky Cadets (left) with a model Savoia Marchetti S-55 flying boat. Right, Jesse Davidson, 1480 Hoe Ave., Bronx, N. Y., holding a Bellanca CH scale model. These models were outstanding features at the aviation show

News Events

contests were conducted by the Shop teachers at their schools and by the other competing clubs individually. All flying contests were held at the 71st Regiment Armory, 34th Street and Park Avenue. An afternoon was set aside for each borough. All the different schools participating in the contest competed against all other schools in the same borough, for the championships of all classes. On Saturday afternoon, February 8, the champions of the five boroughs met to determine the city champions for the Board of Education. After the champions for the Board of Education were decided, they competed again with the winners from all the other clubs and groups to determine the grand championships.

—o—

St. Louis Indoor Show

Climaxing the International Aircraft Exposition held at the St. Louis Arena the National Indoor Model Airplane Contest brought together more than 150 contestants for the final two days' competition.

With four flying events and a scale model exhibition, the youthful plane builders were afforded the opportunity of attending the adult air show with its educational facilities as well as enjoying the keen competition in the huge arena.

Sanctioned by the N. A. A. as an official meet, the outstanding record was set by Harold Dennison, 18, of Marion, Indiana, with a tractor plane which remained aloft 380 seconds. A near second was offered by Joe Ehrhardt, 17, of St. Louis, whose model flew for 308.2 seconds. Rurick Myers, 18, of Chicago, was third, with 261.8 seconds.

The junior hand launched event compared very favorably with the senior when Kenneth Donzelot, 14, of St. Louis, flew his model for 261.3 seconds.

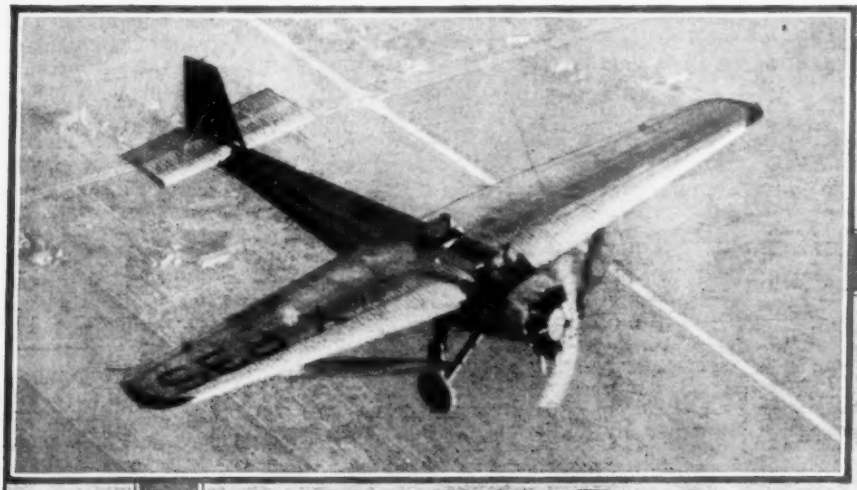
Judges, timers, and scorers, for the event were Joseph Lucas, Bertram Pond, G. E. Bounds, Maj. J. Tully, Capt. J. Bursey, Carl Ehrhardt, Ben Willey, Harry Maynard, and P. F. Drury.

Following are the results of the various events with the highest point winner scoring, which was won by young Ehrhardt of St. Louis, entitling him to a ten weeks' ground course with the Curtiss Flying Service, in St. Louis. (*Continued on page 54*)

This photo indicates the variety of models displayed at the New York Aviation Show. Photograph shows (top, left) Bracio Galdieri, 1264 83rd St., Brooklyn, N. Y., with a model of a Macchi Racing Seaplane S-62, the type entered by Italy in the Schneider Cup Races; (top, center) Dante Algeri, 225 Van Siclen Ave., Brooklyn, N. Y., holding a model Flying Dutchman sport plane, and (top, right) Jack McLaughlin, 35 Clark St., Brooklyn, N. Y., holding a model of a twin-motored Sikorsky amphibian passenger plane. Ben Shereshaw, 2117 Pacific St., Brooklyn, N. Y., is seen (lower left) holding a model Vought Corsair and Douglas Russ, 252 Marion St., Brooklyn, N. Y. (right) is also shown holding a model Corsair

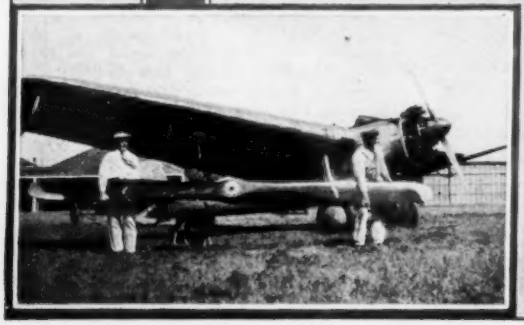
News Events

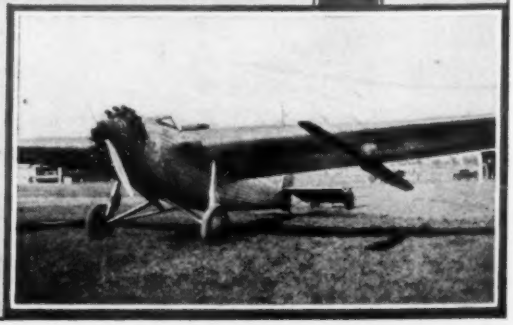
A group of girls, working under the supervision of the Los Angeles Playground Department, who are to compete with boys in model airplane meets



THIS page of exclusive pictures admirably depicts America's outstanding helicoplane, the Johnson "Maid of Milwaukee." At left, the helicoplane is seen in flight and in the circle is shown Victor Allison, test pilot. The two smaller pictures show (left) testing the port helicopter propeller and, right, the helicoplane taking off

THE photo at the right shows the plane landing with the helicopter propellers stopped. Below is shown Jess Johnson (near engine) and friend holding one of the 19 ft. 6 in. helicopter propellers. Another view of the plane is shown at the right. During tests the plane took off in 75 ft. weighing, fully loaded, 5,000 lbs





A Course in Airplane Designing

By Mastering This Valuable Course, the Model Builder of Today Lays the Cornerstone for His Career as the Aeronautical Engineer and Designer of Tomorrow

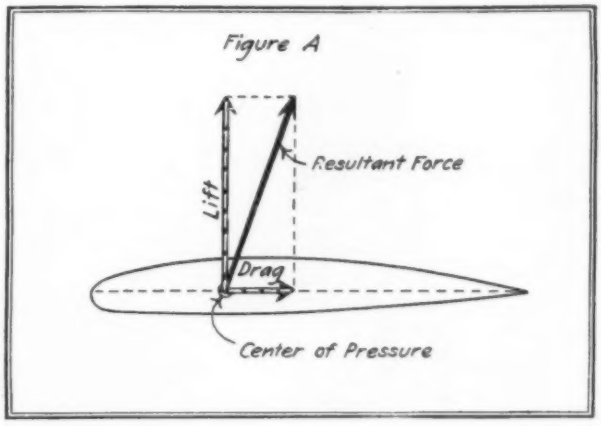
By KEN SINCLAIR

Article 6.

IN presenting this course, MODEL AIRPLANE NEWS *wishes to stress the fact that model building is more than a mere sport. If the builder of model airplanes learns the fundamental principles underlying airplane flight and design, he prepares himself for a future career in the most profitable phase of aviation.*

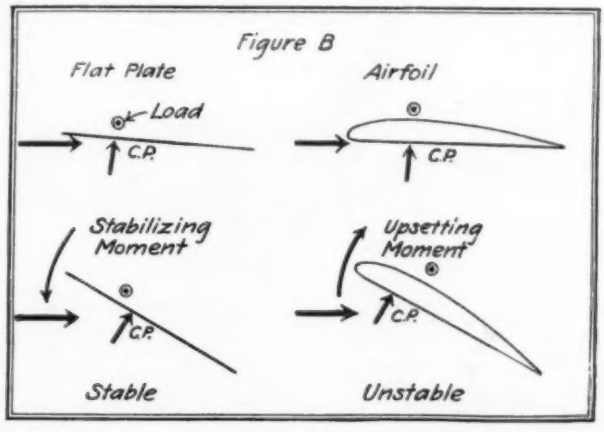
The policy of MODEL AIRPLANE NEWS *is not to encourage or teach its readers to become pilots, but rather to become aeronautical engineers, designers, salesmen, manufacturers, or equip themselves for any other positions which require the training of the specialist or executive. Study this course from month to month, master it in every detail and you will gain a fundamental knowledge of the how and why of airplane design which will be second to none.*

THE EDITOR.



THE wings are a very important part of the airplane. They not not only lift the ship off the ground and sustain it while it is in the air, but they have a lot to do with the ship's stability, and, unfortunately, also with the drag.

To do all these things well we want a wing that will give as large a proportion of lift to area as possible, one that will be stable when used on the ship, and one that will not have too much drag. This is important.



The first thing to do in wing design is to select an airfoil section. For the model airplane we want a section that will give us a large L/D ratio, one that has comparatively little center of pressure travel, and one that can be made light, yet strong.

I have explained the meaning of L/D before, but for the benefit of those who may have missed that article I will say that L/D means nothing more than the ratio of the lift to the drag. If the lift is twice the drag the ratio may be expressed as 2, if the lift is three times the drag it may be expressed as 3, and so on.

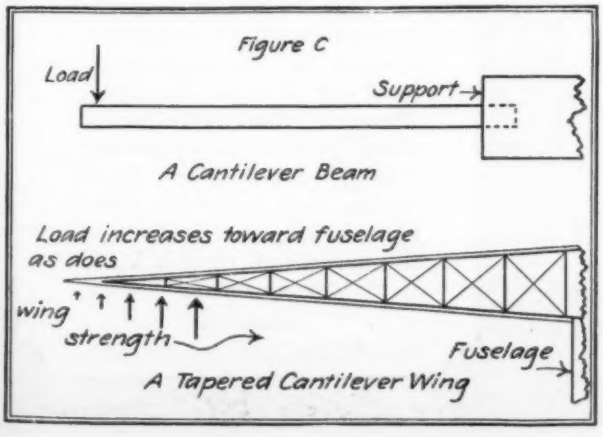
Some wing sections have been used that attained an L/D value of as high as 25. Center of pressure travel needs a little more explanation. The center of pressure is defined as that point on the airfoil chord line that is cut by the resultant force. This is illustrated in Figure A. The resultant force on the wing is the single force that would have the same effect as have the lift and drag, acting together.

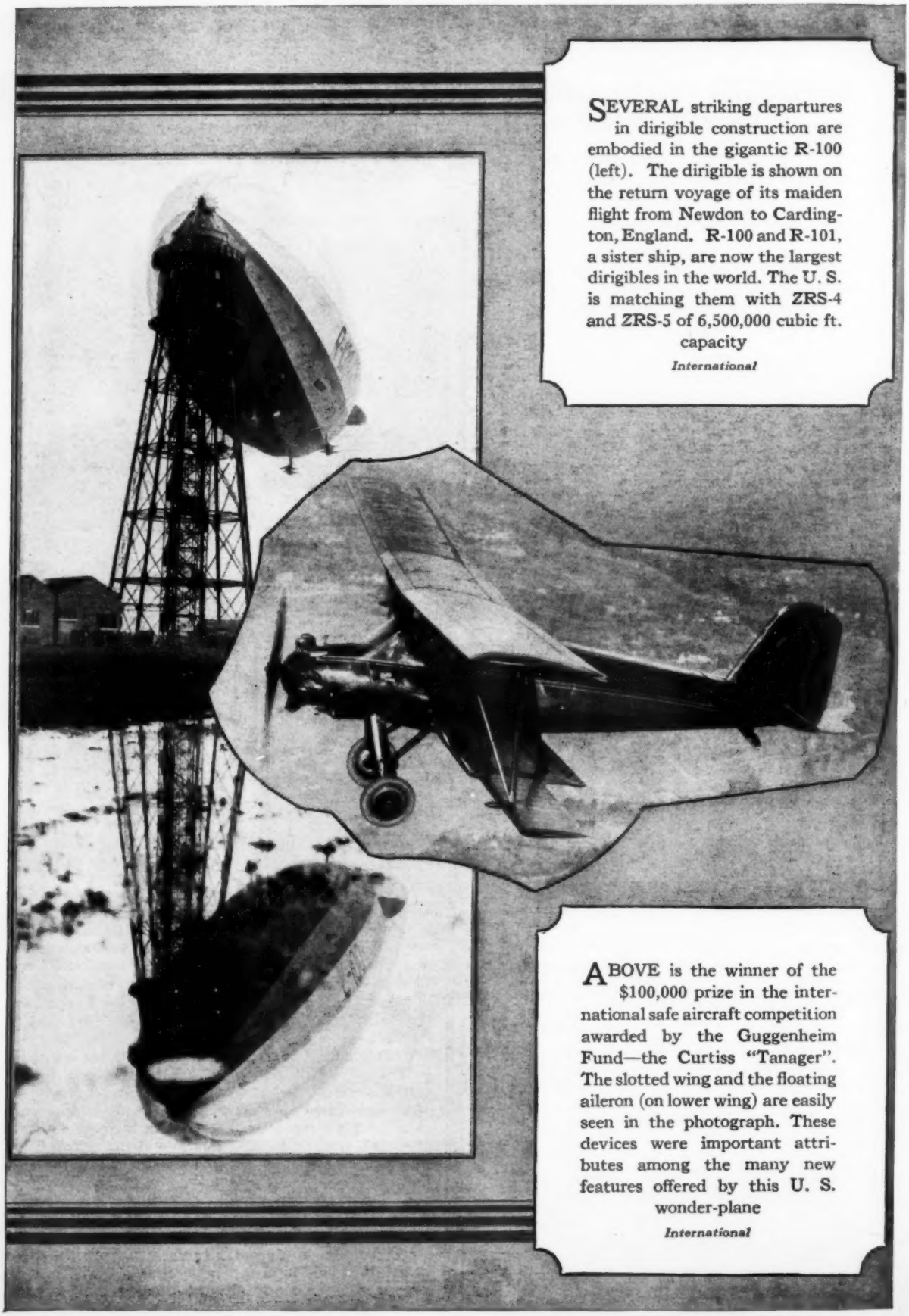
Unfortunately, the center of pressure does not move consistently with change of angle of attack, in the airfoil section.

As illustrated in Figure B, the center of pressure on a flat plate moves backward with increase in angle of attack, tending to force the nose of the airfoil down and to decrease the angle of attack. This is a stable tendency.

In a wing curve, however, the center of pressure, instead of moving backward with angle of attack, actually moves forward at certain angles, tending to force the nose up and still further increase the angle of attack. This is an unstable tendency, and is more pronounced in some airfoils than in others.

We want one that has as— (*Continued on page* 50)





SEVERAL striking departures in dirigible construction are embodied in the gigantic R-100 (left). The dirigible is shown on the return voyage of its maiden flight from Newdon to Cardington, England. R-100 and R-101, a sister ship, are now the largest dirigibles in the world. The U. S. is matching them with ZRS-4 and ZRS-5 of 6,500,000 cubic ft. capacity

International

ABOVE is the winner of the $100,000 prize in the international safe aircraft competition awarded by the Guggenheim Fund—the Curtiss "Tanager". The slotted wing and the floating aileron (on lower wing) are easily seen in the photograph. These devices were important attributes among the many new features offered by this U. S. wonder-plane

International

The Solid Scale Model Which Was the Talk of the N. Y. Aviation Show

How to Build
A Douglas Mail Plane

THE Douglas is a fast, high-powered air mail carrier, used by the leading air mail contractors for the government. A model made according to the plans and instructions, will give you a fine chance to win should you enter it in a scale model contest. The model depicted here was the outstanding one of the recent aviation show in New York. It was built by Jesse Davidson.

Wings

From your material to build this model, select the two pieces of balsa wood from which you are going to make your wings, 1/2" x 3" x 20". Trace the wings from the plans and with a coping saw or sharp knife round out the wing tips. Both wings being the same length and chord, treat each in the same manner. Now you are ready to camber them.

Necessary Materials

2 pieces	1/2" x 3" x 20"	balsa	wings
1 piece	3" x 3" x 13-1/2"	balsa	fuselage
1 piece	1/4" x 5" x 12"	balsa	tail surface
4 strips		bamboo	struts and braces
1 spool		white cotton	
2 pieces	1-1/2" x 1-1/2" x5/16"	balsa	wheels
3 lengths		aluminum tubing	exhaust pipes
1 1-oz. bottle		ambroid	
1 piece	1-1/2" x 1-1/2"	celluloid	windshield
1 ft. No. 10		wire	landing gear
6		wheel bearings	wheels and propeller bearings
1		knife	
1 pair		pliers	
1		cutter	
		smooth and coarse sandpaper	
		spec. colored dope	painting

Plans on Pages 30 to 34

Take a ruler and a pencil, measure 1-3/8", run a light pencil line across both wings from tip to tip. Now wrap a piece of rough sandpaper round a block of wood. Start rubbing toward the trailing edge until you get the half shape of the cambered wing. After this is done, run over it with smooth sandpaper. Repeat the procedure to complete the other half of the camber. See that the tips are rounded out as well as cambered.

Fuselage

From a block of balsa, 3" x 3" x 13-1/2", trace on the smooth side the side view of the fuselage. With a sharp knife cut down to the lines. Taper the nose as shown in the drawing. Run over it with rough sandpaper and smooth it down. Draw the top view of the body on the top side of your piece of balsa and cut to shape. Smooth it down with sandpaper. With a ruler, run over your body and see if it measures up according to the specifications as in the drawings.

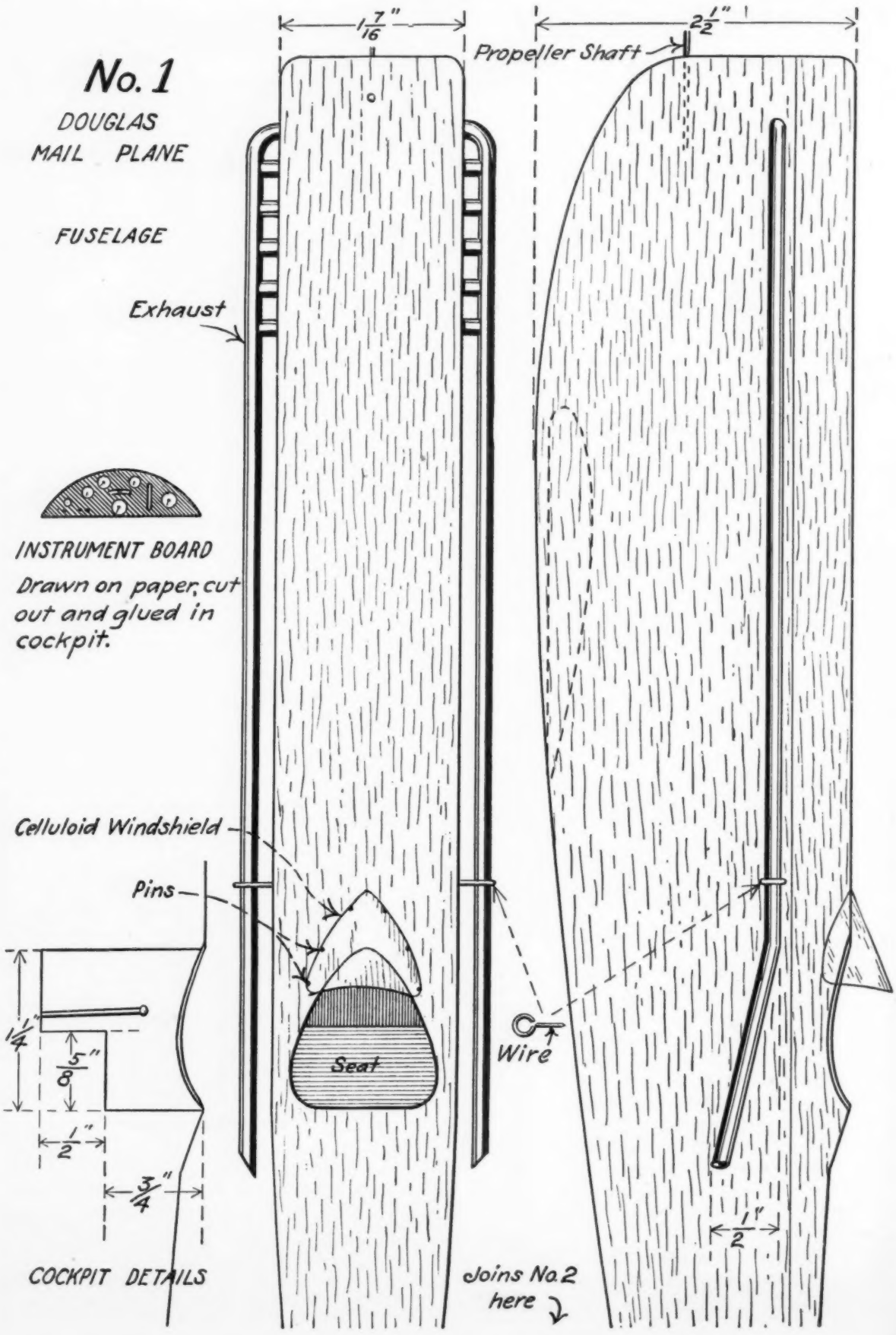
You are now ready to cut out the cockpit. Patience and care must be taken. Trace the position of the cockpit with a pencil. With a sharp knife, preferably with a long pointed blade, cut out the cockpit. Be careful and do not falter, lest you chip the sides. Cut in 3/4". Smooth the rough surface.

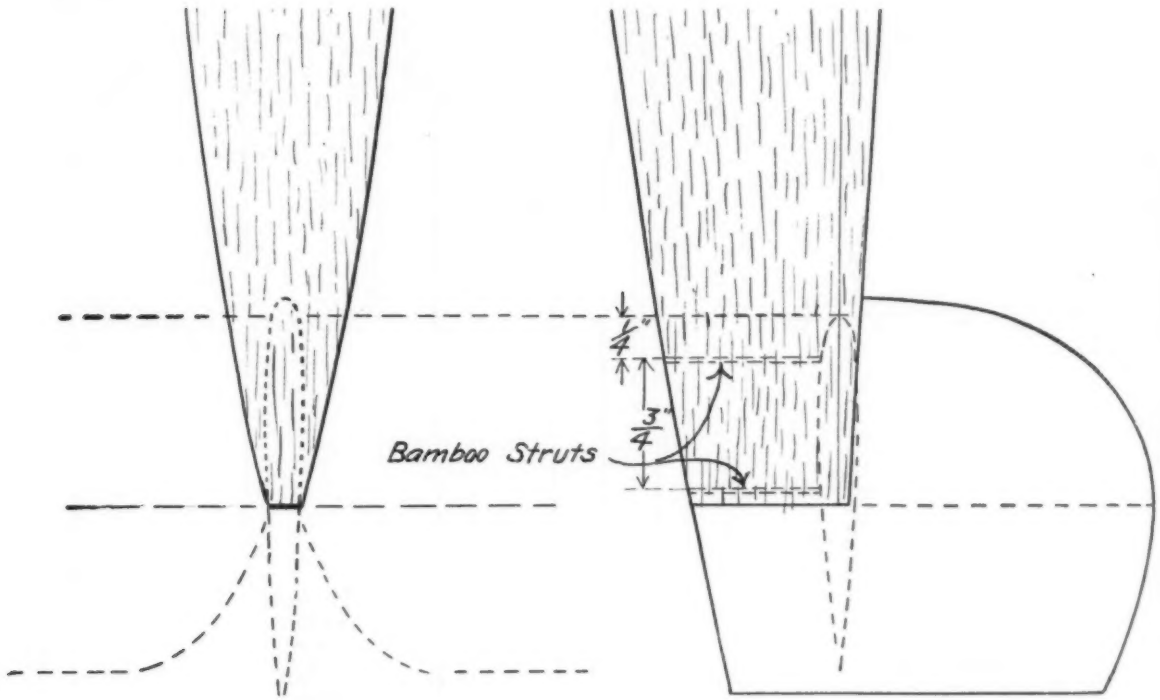
Measure 5/8" from the front of the cockpit and mark a line in the cockpit from that point. With a sharp knife make a cut about 1/2" deep. Chip it out carefully. When this is done, smooth the inside with sandpaper. Now you have the pilot's seat and room for the controls. A miniature joy-stick may be made from a piece of bamboo. Place the joy-stick vertically and affix it with ambroid.

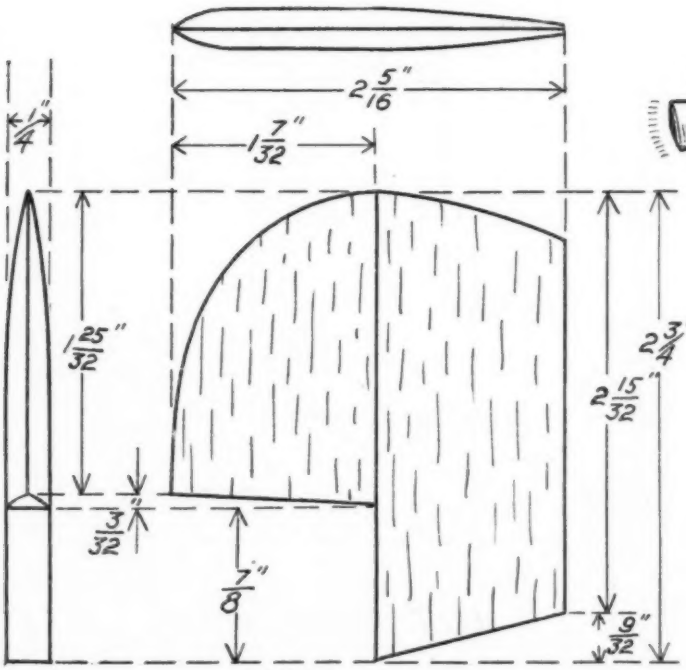
The rudder bar may be composed of a thin strip of balsa. Place it about 3/8" in front of the joy-stick in a horizontal position. Put a pin through its center so that it may be movable. Make the instrument board as shown in the drawing and glue it properly where it belongs. From a piece of celluloid, design the windshield as shown in drawing. With pins fasten it as shown and ambroid securely.

Exhaust Pipes

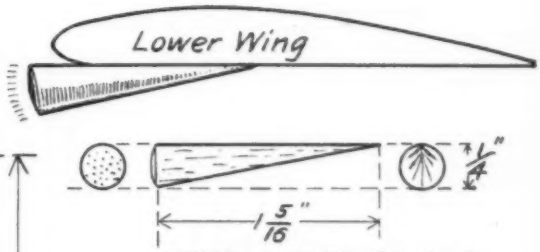
Take the three strips of 1/8" tubing. With your knife cut from the tubing ten pieces 3/8" long. After this has been done, cut from two lengths, two pieces 8-3/8" long. At the front ends, bend as shown in drawing. Now measure 1/2" from the nose of the fuselage and mark it. Measure 9/16" down from the top of the body and mark it. Now draw a line 2-1/8" long on both sides of the body. Take the long strips of tubing and push 1/4" into the balsa at the beginning of the line. (*Continued on page* 52)


No. 1
DOUGLAS
MAIL PLANE
FUSELAGE
1 7/16"
2 1/2"
Propeller Shaft
Exhaust
INSTRUMENT BOARD
Drawn on paper, cut out and glued in cockpit.
Celluloid Windshield
Pins
Seat
Wire
1 1/4"
5/8"
1/2"
3/4"
COCKPIT DETAILS
1/2"
Joins No. 2 here

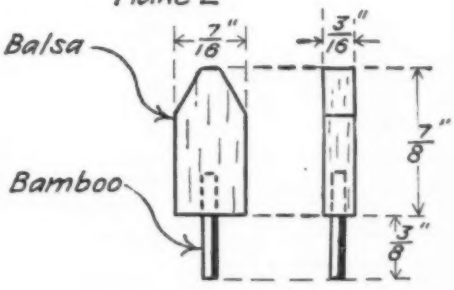




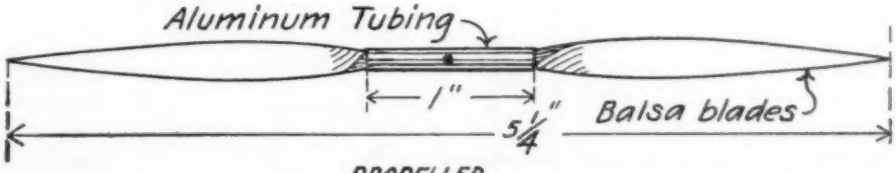
RUDDER



WING LIGHTS (Balsa)
Make 2

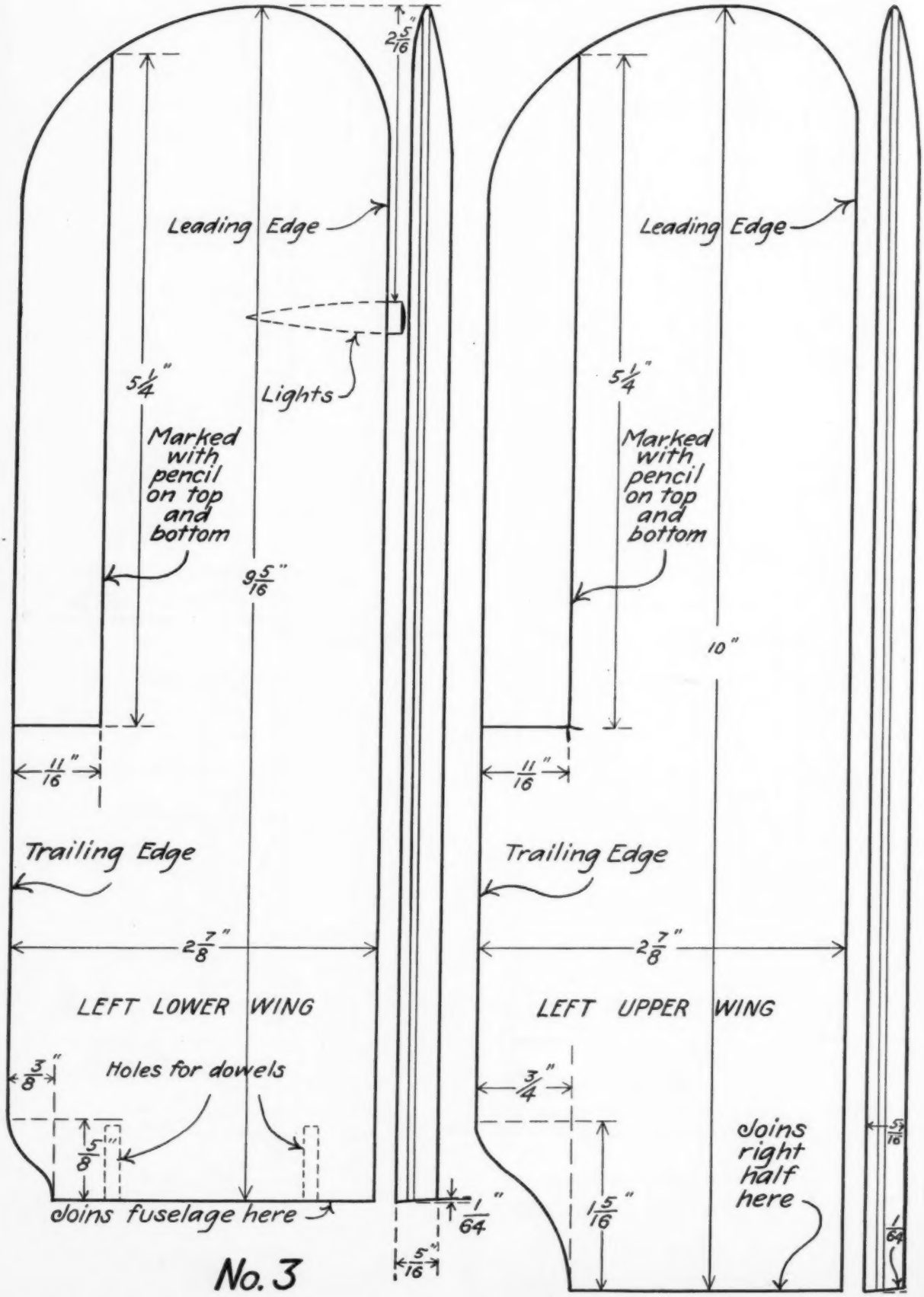


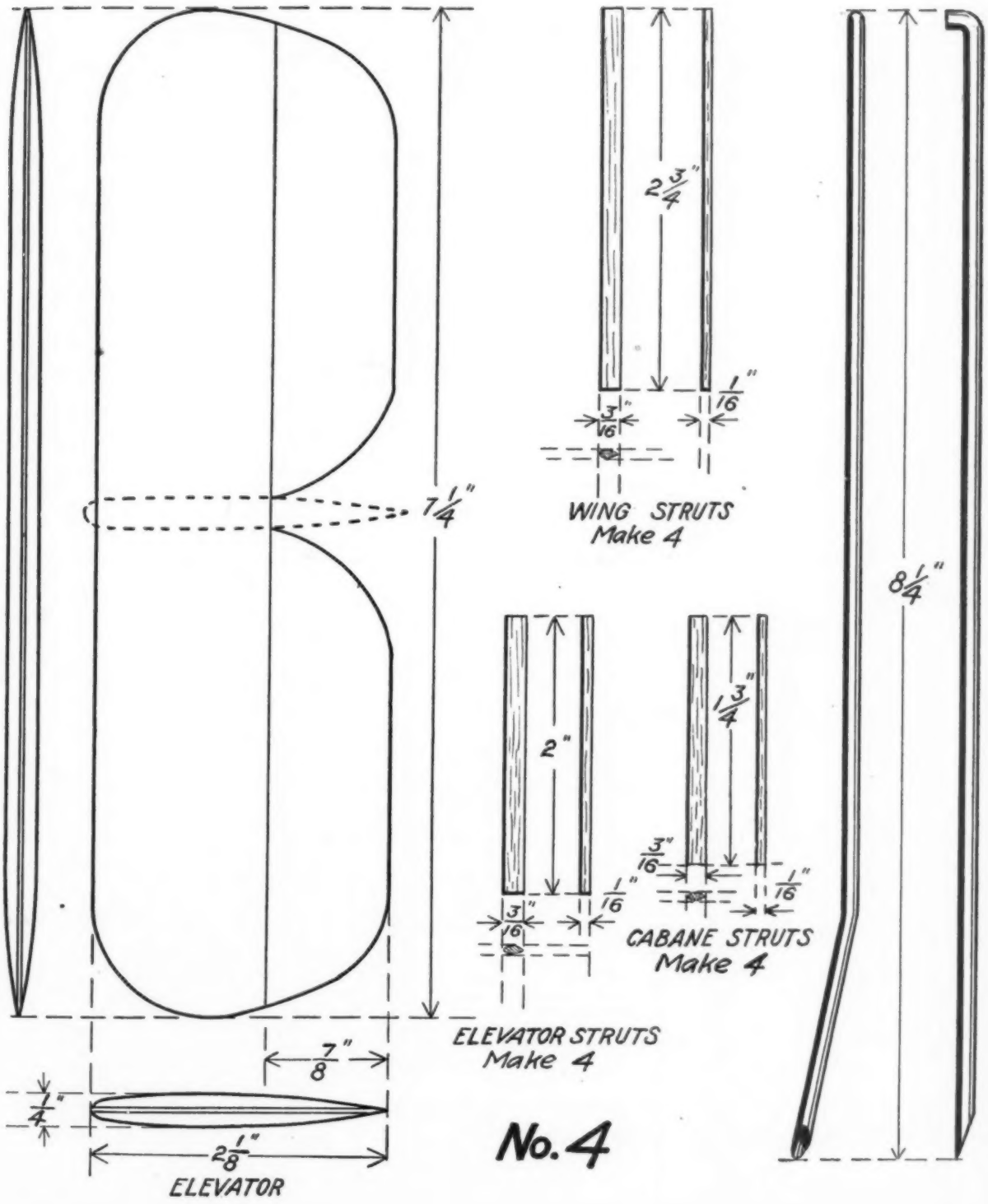
SHOCK ABSORBERS
Make 2

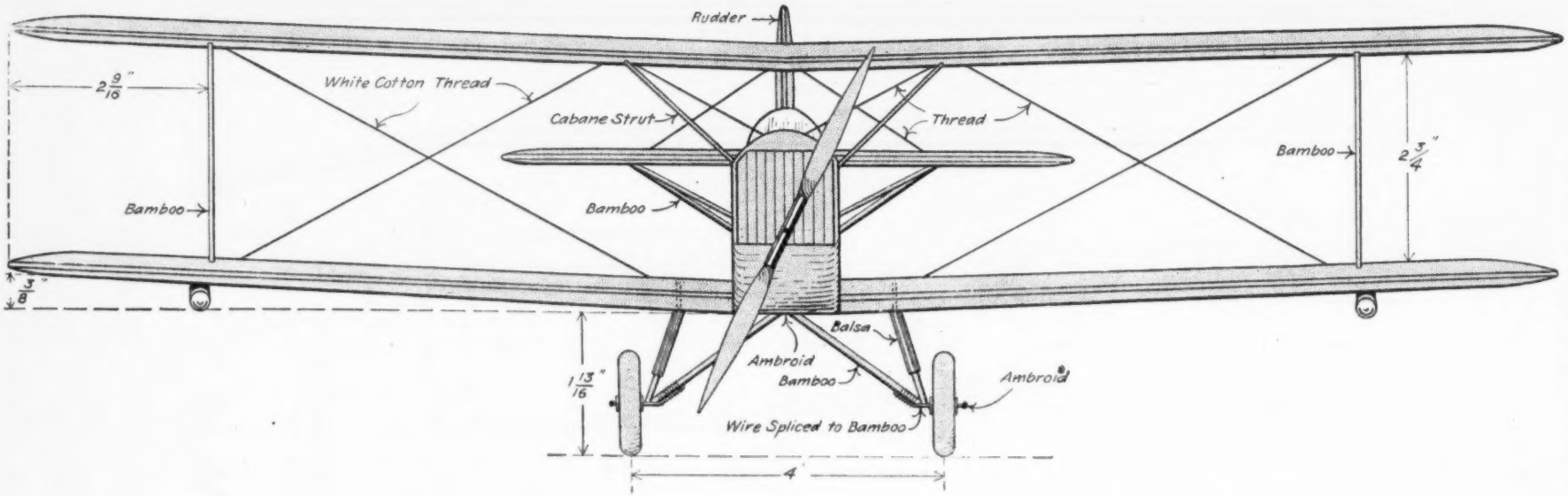


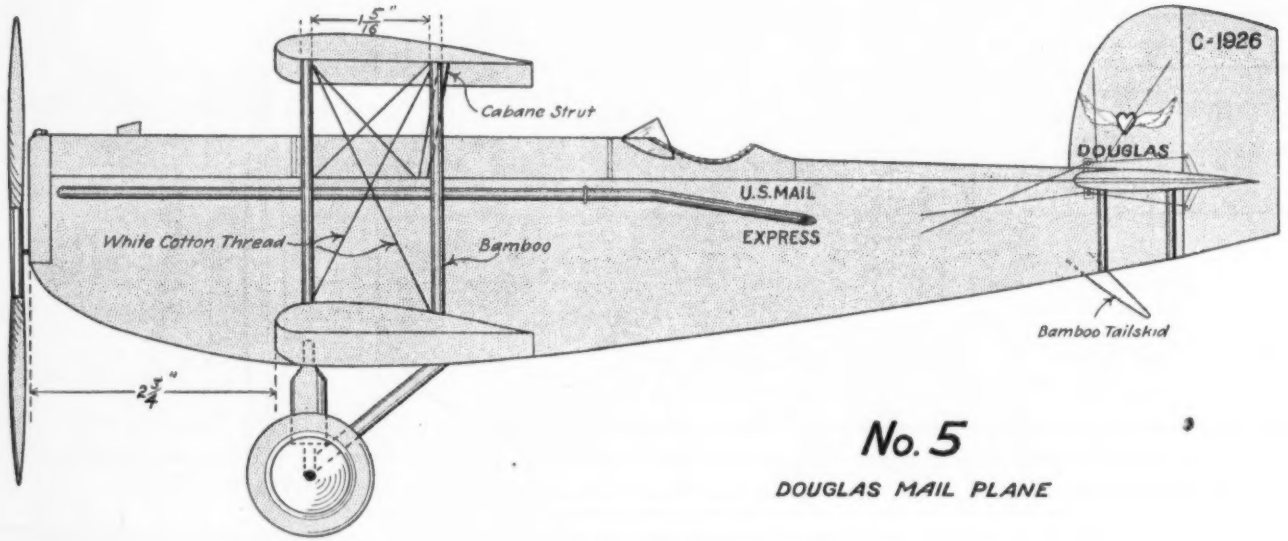
PROPELLER

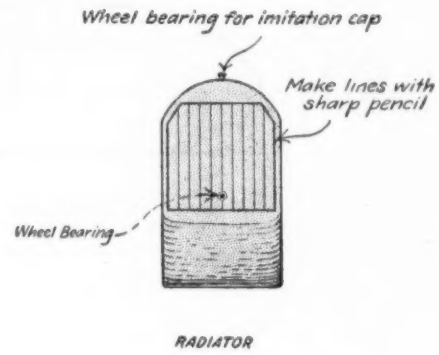
No. 2


2 5/16"
Leading Edge
5 1/4"
Lights
Marked with pencil on top and bottom
9 5/16"
11/16"
Trailing Edge
2 7/8"
LEFT LOWER WING
3/8"
Holes for dowels
5/8"
Joins fuselage here
1/64"
5/16"
No. 3
Leading Edge
5 1/4"
Marked with pencil on top and bottom
10"
11/16"
Trailing Edge
2 7/8"
LEFT UPPER WING
3/4"
1 5/16"
Joins right half here
5/16"
1/64"


7 1/4"
7/8"
1/4"
2 1/8"
ELEVATOR
2 3/4"
3/16"
1/16"
WING STRUTS
Make 4
2"
3/16"
1/16"
ELEVATOR STRUTS
Make 4
1 3/4"
3/16"
1/16"
CABANE STRUTS
Make 4
8 1/4"
No. 4







RADIATOR

No. 5

DOUGLAS MAIL PLANE

MACFADDEN AVIATION ADVISORY BOARD

Conducted by
Capt. H. J. LOFTUS-PRICE
(Ex-Royal Air Force)

CHAIRMAN OF THE BOARD

"WHAT would happen if an all-metal airplane was struck by lightning?"

"Please give me all the information you can about the Barling NB-3, which created a new light plane altitude record recently."

"How many glider manufacturers are there in America?"

"What do you know about the Bowlus glider used by Col. Lindbergh?"

These are typical of the questions which have been asked by readers, so we hasten to answer them as follows:

The question of what lightning would do to an all-metal plane is something which yet has to be answered definitely by even the most experienced of experts. It is a question which has been taken up by many laboratories and government authorities and the aviation industry in general, and tests are being carried out daily.

So far, the most productive tests, and those which to the present give rise to the impression that "no damage" is done, have been carried out by the Nicholas Beazley Co., of Missouri on a Barling NB-3. The tests are being carried out at the laboratories of the Ohio Insulator Co., at Akron, and the apparatus used is especially built to give, as nearly as possible, the exact results of natural lightning.

The NB-3, with its engine running, is so revolved and moved about as to be struck at various points and different angles and subjected to the tearing force and splintering shocks of strokes, presumably the same as might happen naturally when flying through a thunderstorm.

A series of many discharges varying from 1,000,000 to 2,000,000 volts has been used and it is expected that these tests, when finished, may help to clear up the mystery of several aerial mishaps in which expert opinion has differed greatly as to whether lightning was partly or wholly responsible.

A few of the outstanding performances of the Barling NB-3 are as follows:

The most recent was the creation of the new biplane altitude record of more than 5 miles by Dwight (Barney) Zimmerly at St. Louis on Feb. 16, 1929.

On May 28, 1929, at St. Louis, Dwight Zimmerly climbed to 22,862 ft. to create an American record for light planes. Two hours and forty-two minutes were taken up from take-off to landing in this flight.

Then on July 7, 1929, the Barling NB-3 established a new world's non-stop distance record for this type of plane when Zimmerley flew from Brownsville, Texas, to Winnipeg, Canada, 1,650 miles by air in sixteen hours. He averaged 103 miles an hour for sixteen hours with a 60 horsepower engine. The former record was 1,249.6 miles.

The same type of plane was first in speed and first and second in efficiency during the 1929 National Air Races at Cleveland, Ohio.

The Barling also came in first in the free-for-all at the 1929 International Air Races at Kansas City, Mo., and was first in speed and efficiency in the light plane efficiency contest at the same meeting.

The specifications are as follows:

Span	32 ft. 9 in.
Chord	5 ft. 2 in.
Length	21 ft. 11 in.
Height	7 ft. 6 in.
Dihedral	5 degrees
Top Speed	105 mi. per hour avg.
Cruising Speed	— 1,750 r.p.m.— 87 mi. per hour
Service Ceiling	8,000 ft.

—o—

On the question of glider manufacturers and how plans can be obtained for the construction of gliders, below you will find a list of manufacturers, and we would suggest that you write direct to them. There is no guarantee that all these manufacturers will supply plans from which you will be able to build gliders.

As a matter of fact, our strict advice to any boys wishing to start glider clubs or become glider enthusiasts is to seek the advice of experts on the matter and not trust themselves to home-made sail planes, etc.

It must be remembered that experts who for many years have studied this new and most thrilling sport know considerably more about it than amateurs, whose chief desire is to obtain a new thrill for the fun of it, so to speak. It is wiser to purchase an aerodynamically perfect and properly constructed glider than to risk one's safety in a home built machine.

The list is as follows:

ALEXANDER INDUSTRIES, INC.,
Colorado Springs, Colo.
HERACLIO ALFARO,
6611 Euclid Ave.,
Cleveland, Ohio.
AMERICAN MOTORLESS AVIATION CORP.,
270 Madison Ave.,
New York City.
AMERICAN SAILPLANE CO.,
Lynn, Mass.
BAKER-MCMILLEN CO.,
Akron, Ohio.
CAPE COD GLIDER SCHOOL,
South Wellfleet, Mass.
CESSENA AIRCRAFT CORP.,
Wichita, Kansas.
CLARENCE N. COOK,
27 Stubbs Bldg.,
Kansas City, Kan.
PROF. R. E. FRANKLIN (custom built job)
c/o Univ. of Mich.,
Ann Arbor, Mich.
GLIDERS, INC. (division of Detroit Aircraft Corp.)
115 Campau, Detroit, Mich.
GLIDER MACHINE FACTORY OF WM. E. SCRIPPS, JR.,
Orion Hills, Mich.
GRAM-WILLIS FRAME & MFG. CO.,
(spruce parts), Portland, Ore.
JOHNSON AIRPLANE & SUPPLY CO.,
(general parts), Dayton, Ohio.
LEONARD MOTORLESS AIRCRAFT CORP.,
Grand Rapids, Mich.
MATTLEY AIRPLANE CO.,
San Bruno, Calif.
NATIONAL GLIDER ASSOCIATION,
Detroit, Mich.
NORTHWEST AIRCRAFT & MOTOR CO.,
Seattle, Wash.

—o—

The Bowlus sail plane used by Col. Lindbergh and designed and constructed by Mr. William H. Bowlus, plant manager of the B. F. Mahoney Aircraft Corp., of San Diego. He was the builder of Lindbergh's famous "Spirit of St. Louis."

(*Continued on page* 58)

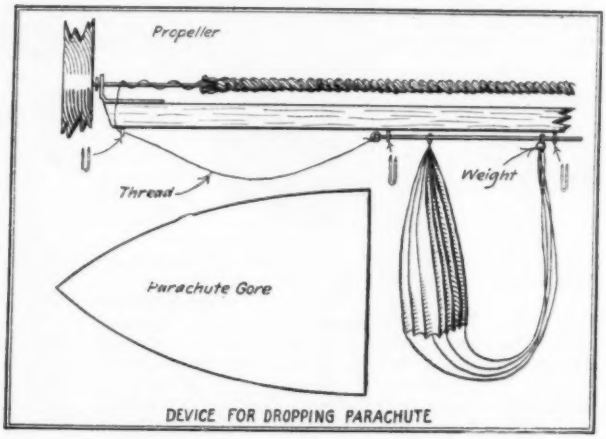
EACH month the Macfadden Aviation Advisory Board will endeavor to answer all questions concerning model building and aviation in general. Address all questions to

The Macfadden Aviation Advisory Board,
MODEL AIRPLANE NEWS
1926 Broadway,
New York City

Enclose with your letter a self-addressed and stamped envelop to facilitate an answer, as space is limited and all letters can not be answered in these pages.

Hints to Model Makers

Here Are a Few Short Cuts Which Should Prove of Value to Model Makers



DEVICE FOR DROPPING PARACHUTE

A Working Parachute for Models

Another Propeller Plan

A Working Parachute for Models

by Yale Mintz

DID you ever wish, as you watched your model banking and circling overhead that it would be possible to carry out the game to its limit and have your imaginary pilot "bail out"? Did you ever wonder if it would be possible to have a perfect scale model of the silver 'chute come swinging down? Easiest thing in the world.

First make three small U's out of fine wire. Find the center of gravity of your plane by balancing it on your finger tip, and make a small pencil mark there. Then force two of the U's into the fuselage stick 1/2" on each side of the mark you made. Press the third U into the fuselage stick just opposite the propeller shaft.

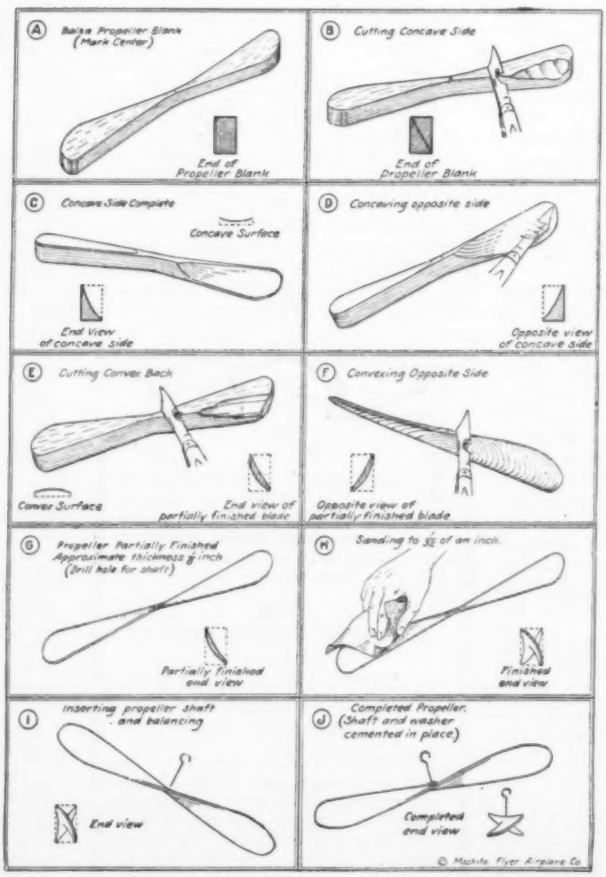
Now take a straight piece of the same wire 1-1/2" long and bend a small loop at one end. Tie a length of thread to the loop, pass the thread through the U near the propeller and tie it to the propeller shaft. Only experiment will show how long to make this thread.

The parachute may be made by pasting together eight gores as shown in the drawing and attaching strings to each seam. Join the strings at the bottom and attach a weight. Paste a small loop at the top of the chute, in addition to one at the bottom of the weight.

Now everything is set. Put the 1-1/2" piece of wire through the first U. Place the loop at the top of the parachute on the wire, and then put on the loop at the bottom of the weight and push the wire through the second U. Wind the model up with a winder, and launch.

As the model keeps climbing, the thread winds up on the prop shaft. When the model reaches its greatest height, the thread will pull the piece of wire out of the U and the weight will fall, pulling the chute with it. As the plane flies overhead, the parachute will float gently to earth.

This stunt is even more fun when tried with a fuselage model. If your model will carry the weight, try using a clothespin as when falling it gives a startlingly realistic picture of a real human being.


A Balsa Propeller Blank (Mark Center)
End of Propeller Blank
B Cutting Concave Side
End of Propeller Blank
C Concave Side Complete
Concave Surface
End View of concave side
D Concaving opposite side
Opposite view of concave side
E Cutting Convex Back
Convex Surface
End view of partially finished blade
F Convexing Opposite Side
Opposite view of partially finished blade
G Propeller Partially Finished Approximate thickness 1/8 inch (Drill hole for shaft)
Partially finished end view
H Sanding to 1/32 of an inch.
Finished end view
I Inserting propeller shaft and balancing
End view
J Completed Propeller. (Shaft and washer cemented in place)
Completed end view
© Mashite Flyer Airplane Co.

Another Propeller Plan

By Joseph N. Hettel, Jr.

HERE is a plan for making propellers much cheaper, quicker, and with less work than the old method of hand-carving. First, take a sheet of paper and draw the shape of a propeller. Cut it out and lay it on a sheet of balsa veneer, tracing around the edge with a pencil. Now cut the shape out of the wood with a knife or razor blade.

Next, sandpaper the veneer down to the desired thickness, which is that of heavy paper, and balance it by laying on a knife edge. If one side is heavy, sandpaper it down until there is perfect balance.

When this is perfect, hold the center or hub of the propeller in a jet

(*Continued on page* 58)

JUNIOR MECHANICS DEPARTMENT

Prof. Movie and Dr. Radio Will Be Schoolteachers of Tomorrow

By CALEB JOHNSON

A FEW weeks ago three hundred leaders of education sat in a room at the Carnegie Institute of Technology in Pittsburgh and watched four great scientists perform experiments, at the same time explaining just what they were doing and why.

Three of the lecturers were at that moment in England, the fourth was five hundred miles away, in Schenectady. The audience, however, obtained a clearer view of the experiments of Sir Oliver Lodge, Sir Ernest Rutherford, Sir William Bragg and Dr. Irving Langmuir than they could have had if those men had been physically present in the lecture hall.

They did not have to crane their necks or strain their eyes to see what was going on. Apparatus which was too small to be seen clearly at a distance of a few feet was magnified until it was plainly visible across the room. Effects which in an ordinary laboratory can be observed only through a microscope were projected on the screen so that hundreds could follow them clearly at the same time. The lecturers are themselves more plainly visible and their voices clear and easily understood.

You have guessed already that this was a demonstration of talking motion pictures as applied to education, and if you stop to think about it you will realize, as those educators in that audience did, that the schools of the future will depend more and more on the "talkies" and on the radio for instruction of their pupils.

Today it is entirely possible for a complete educational course, including all the essential elementary subjects and all the way to higher mathematics, languages, science, history and economics, to be put on by means of the motion picture, and radio programs already being broadcast could be used to supplement such a course, so that it is conceivable that a group of children living in the most remote rural district could "attend" school, from kindergarten to post-graduate university work, without ever leaving their home counties.

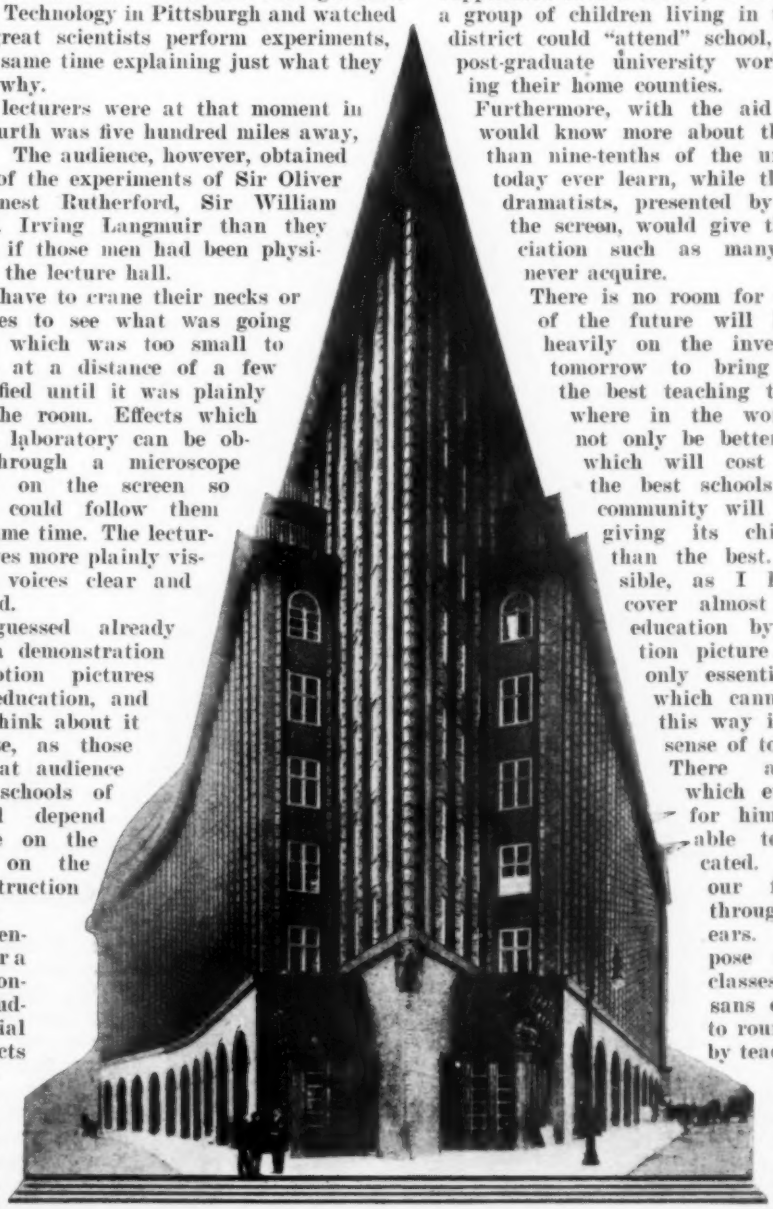
Furthermore, with the aid of travel films they would know more about the world they live in than nine-tenths of the university graduates of today ever learn, while the works of the great dramatists, presented by competent actors on the screen, would give them a cultural appreciation such as many university students never acquire.

There is no room for doubt that the school of the future will lean more and more heavily on the inventions of today and tomorrow to bring into the classroom the best teaching that is available anywhere in the world. The result will not only be better schools, but schools which will cost so much less than the best schools cost today that no community will have any excuse for giving its children anything less than the best. Already it is possible, as I have pointed out, to cover almost the whole field of education by means of the motion picture and the radio. The only essential part of education which cannot be carried out in this way is the training of the sense of touch.

There are certain things which everyone has to learn for himself if he is to be able to call himself educated. We learn through our fingers as well as through our eyes and our ears. The underlying purpose of manual training classes is not to make artisans out of schoolboys but to round out their education by teaching them how things feel.

To the eye a piece of pine wood and a piece of oak look very much alike. But the man who as a boy learned how to whittle, saw or drive nails into

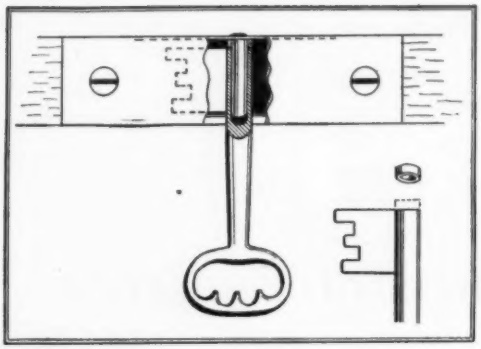
(*Cont'd on page* 56)



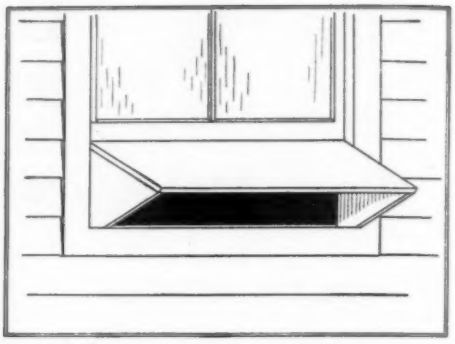
A LANDGOING SHIP OF BRICKS AND MORTAR

An eight-story clinic and office structure erected in Hamburg, Germany in perfect reproduction of a huge ship *International*

Home Labor Saving Devices

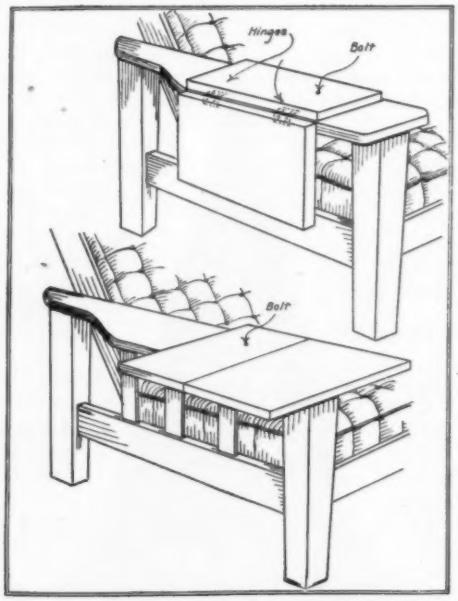


A Few Examples of Handicraft



The Master Key

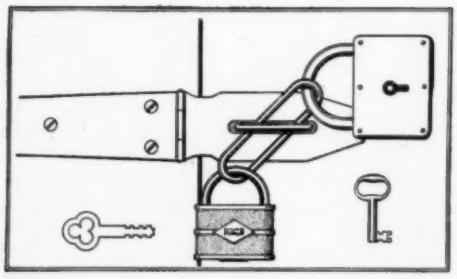
It's easy to make a private lock, even in cases where all the keys are alike. With a fine saw, carefully cut off about one-sixteenth of an inch from the business end of the key. Take this collar and force it down the post of the keyhole until it is jammed tightly in place. If it does not stick, hammer it a little out of true. Now the key from which you cut the piece will unlock this lock, but no other key will enter far enough. Your cut key will still unlock other locks of the set!



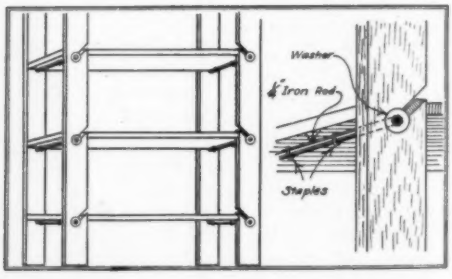
When It Rains

To prevent snow or rain from blowing in through the always-open windows of the sleeping room, the device shown in the accompanying illustration has proved itself handy. Three pieces of light half-inch board are nailed together as shown, and the weight of the window itself will hold it in place.

IT is often desirable to secure extra shelf space in the home closet without marking the walls. A portable shelf system, removable in ten minutes, may be built by following these directions. Take four pieces of one by two inch pine, cut to the exact

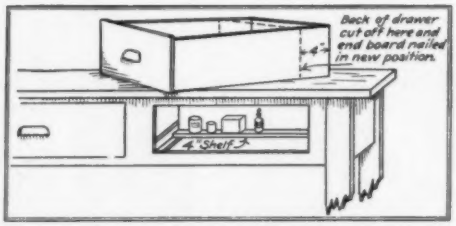


Modernize the Easy Chair



A Padlock Stunt

Though a door is locked with two padlocks, it is possible to open it with just one key. The accompanying illustration shows an arrangement which has proved handy on locker doors where two men share the same space, and where each has a single-key padlock. A long steel link is inserted in the staple of the door lock, and the two padlocks hang on either end. No matter which of the two men desires to open the locker, he can do so by merely opening his own padlock, which will let the link slide out, and free the lock.



To Make a "Hideaway"

Closet Shelves

height of the closet, and bore quarter-inch holes along these uprights, through the wide side. Leave whatever space between the holes you want your shelves to be; eight inches is a convenient height. Saw out slots on a slant down to these holes as shown in the drawing.

Now cut your shelves, a little less than the closest width. Across the end of each shelf, on the bottom, fasten with staples a quarter-inch iron rod. If your shelves do not have to bear great weight, you may use a wooden (*Continued on page* 63)

JUNIOR MECHANICS DEPARTMENT

How to Build a Sail Boat

A Scroll Saw, Wood, Sandpaper and Glue Make an Attractive and Practical Ship

By GEORGE F. WILD

See Plans on Pages 40 to 43

WHAT better fun for the camp or the old swimming hole than a sail boat contest? What better triumph than to win the contest with a boat you have built yourself? "None," you say. Right. Well, then, why not build a sail boat?

Just imagine how easy it is, too. A few minutes with a scroll or coping saw, a tack hammer, a half-inch chisel, a hand drill and some wood and glue, and soon your boat begins to take shape. A little patience and a great deal of care, some cotton for the sails, the launching, and away she goes! Doesn't that sound thrilling?

All right, we're ready.

First and foremost, study the plans carefully. You will see that some of them have to be scaled up to size. Plans 1, 4, 5, 6, 7, 8, 10 and 11 are given full size.

It is best to start with the keel—plan 1. Cut this out of a piece of wood one-quarter inch thick. The keel will act as a templet for shaping the bottom of the boat. Then follow up with the hull, which is made up of six pieces cut from wood half-inch thick. A scroll or coping saw is needed for this purpose.

After the hull pieces are cut out, chisel and sandpaper them to a smooth finish. Then glue them together, starting with the smallest piece at the bottom. It is sometimes found helpful first to tack them together before gluing so that the pieces can be placed properly in position.

Be sure to use a waterproof glue, and also to give the boat a good covering of white lead to make it waterproof and stop possible leaks. Also be careful to see that the keel lines up with the lifts in the bow.

Top—Fixing the keel in position
Center—stepping the mast
Bottom—Cutting out the top deck

When the hull is finally assembled in rough shape and the glue has been allowed to dry thoroughly, take your chisel and sandpaper and, starting at the gunwale, fare away and smooth off all corners down to the keel. Remember that the more care you take in doing this, and the better and smoother outside finish you get, the better performance you will obtain from your boat on the water. The object in faring away the corners is to give a real ship's hull finish to your model.

Many builders of this model also have scraped away a great deal of the inside, thus lightening the boat. If you do this you must guard against breaking through the side of the hull.

The plans are virtually self-explanatory, but the following is a list of key letters and to what they refer:

2a is the bowsprit. This should be glued on after the hull has been shaped.

3 is the deck, to be cut out of one-quarter inch wood.

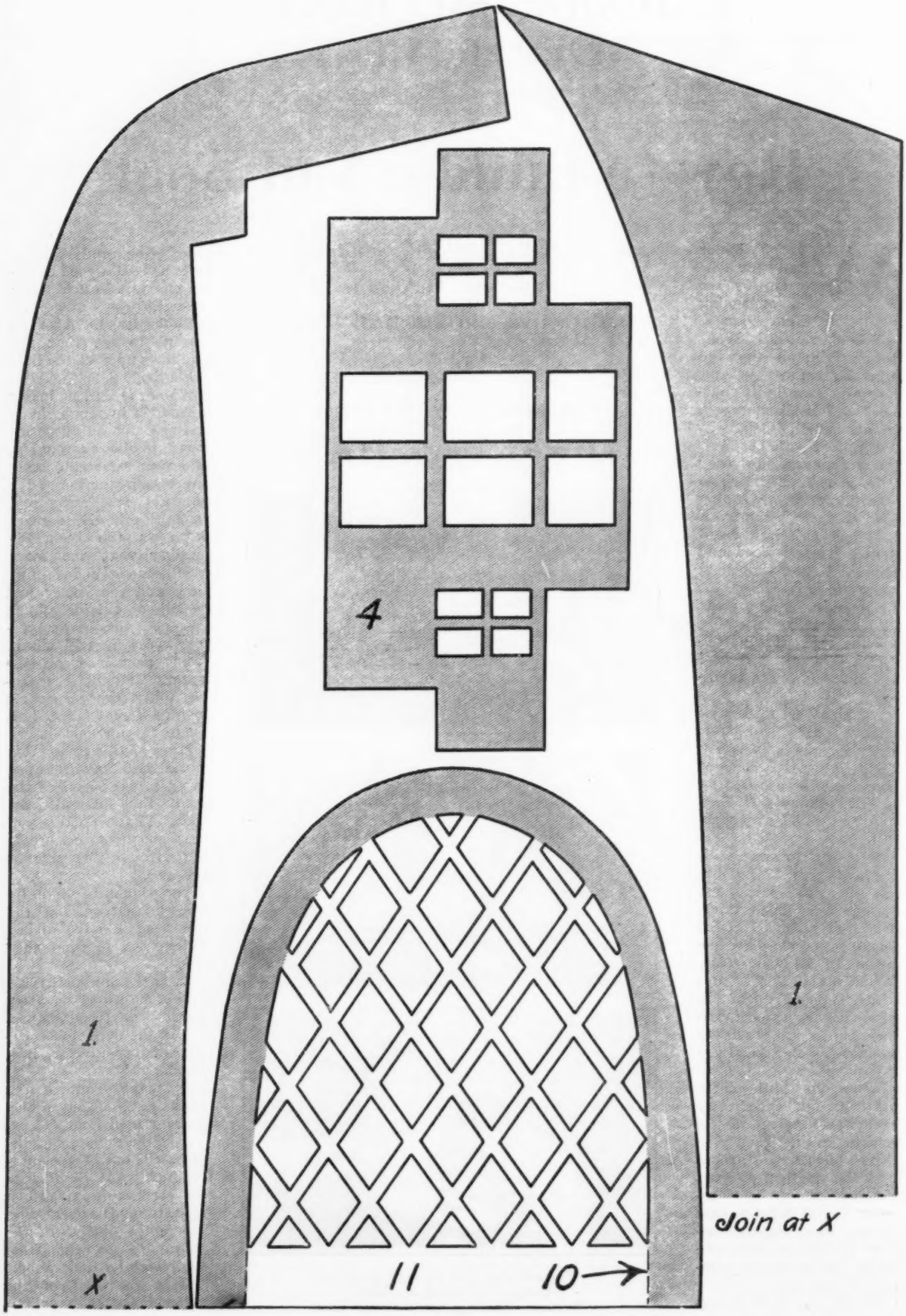
4 is the front of the cabin, to be cut out of one-quarter inch wood.

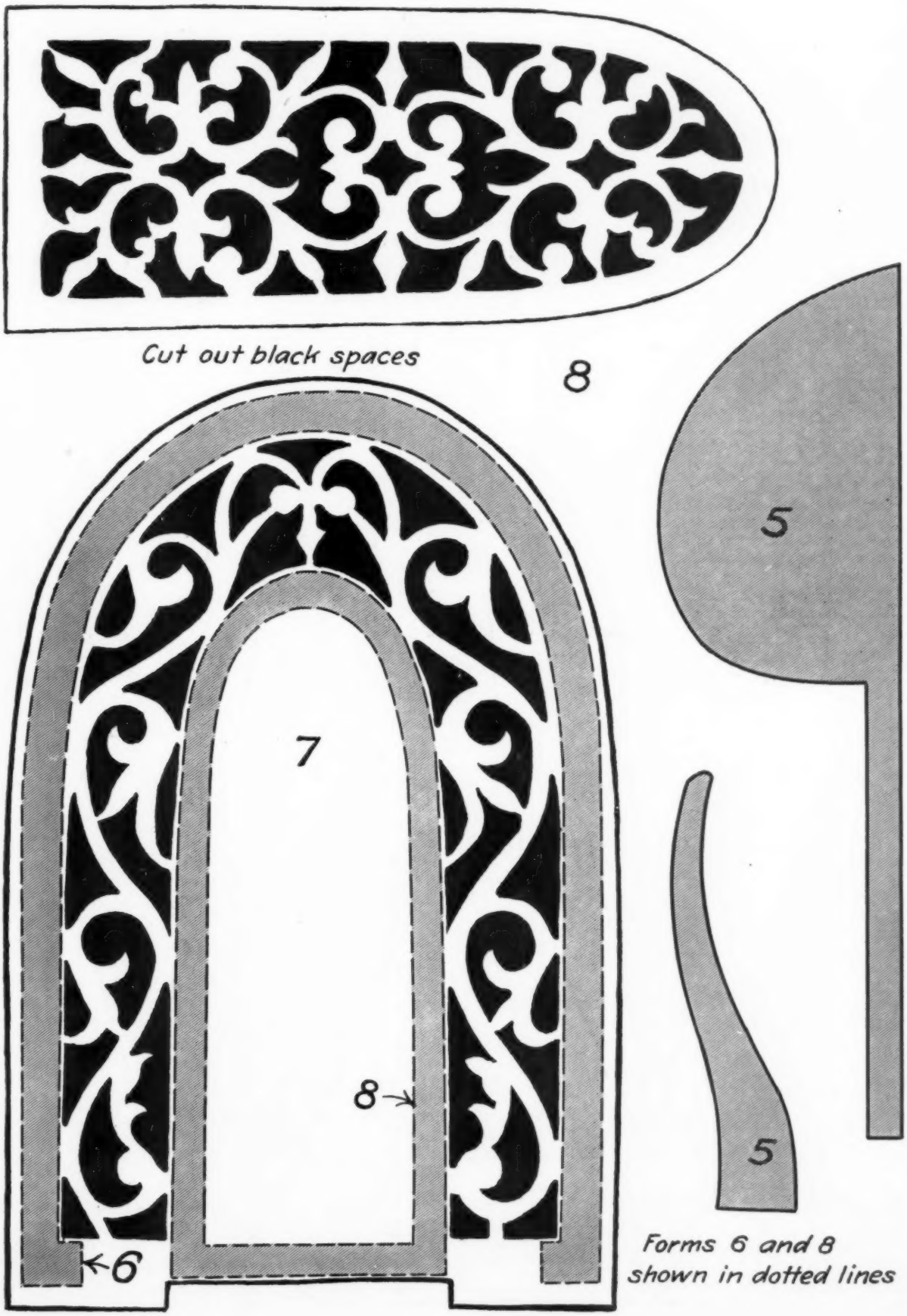
5 is the rudder handle, to be cut out of one-quarter inch wood. Sandpaper all corners to give it a neat, rounded appearance.

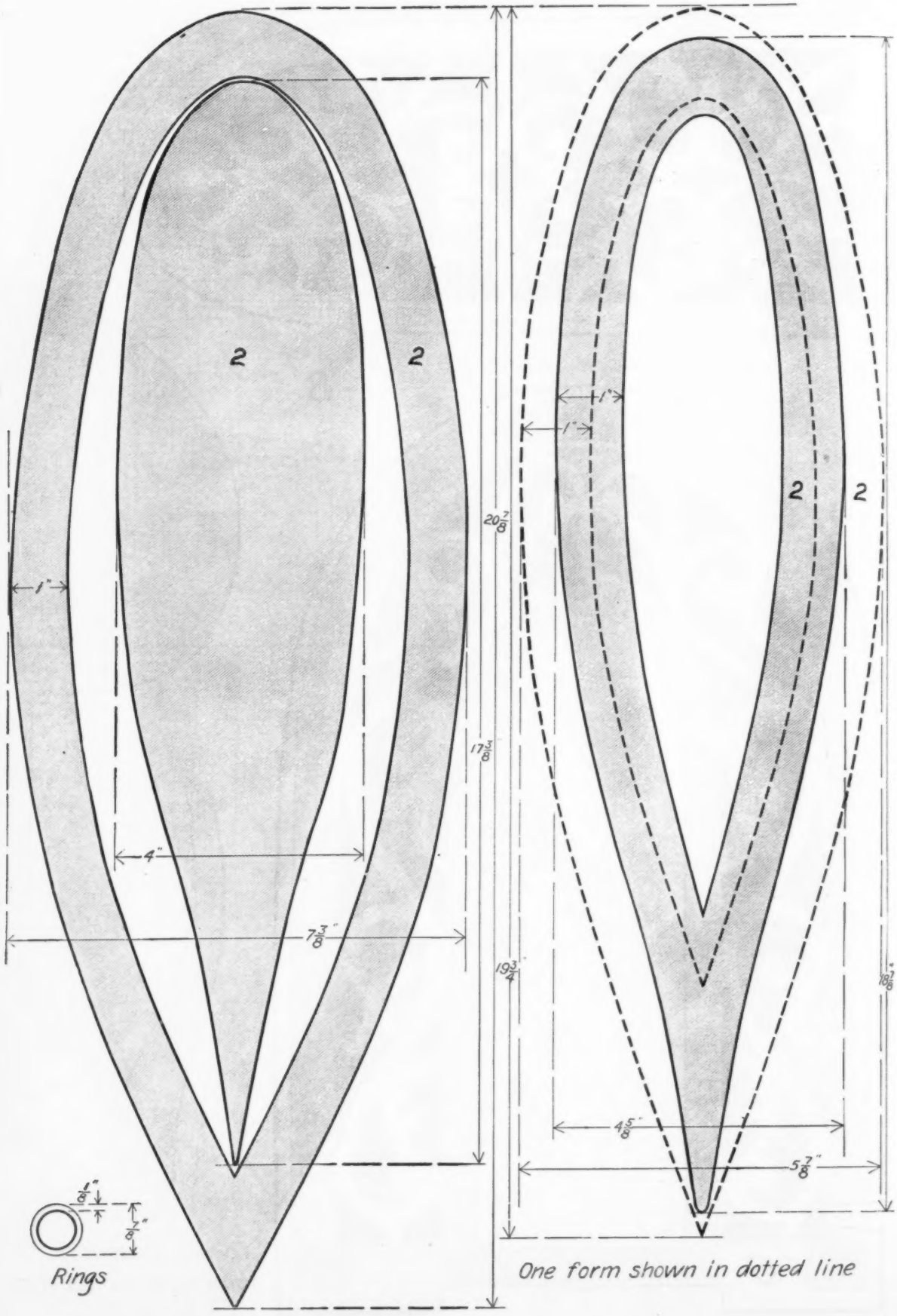
6 is the outline of the cabin, to be cut from seven-eighths inch wood.

7 is the roof of the

(*Continued on page* 52)


4
1.
1.
X
11
10
Join at X


Cut out black spaces
8
5
7
8
6
5
Forms 6 and 8
shown in dotted lines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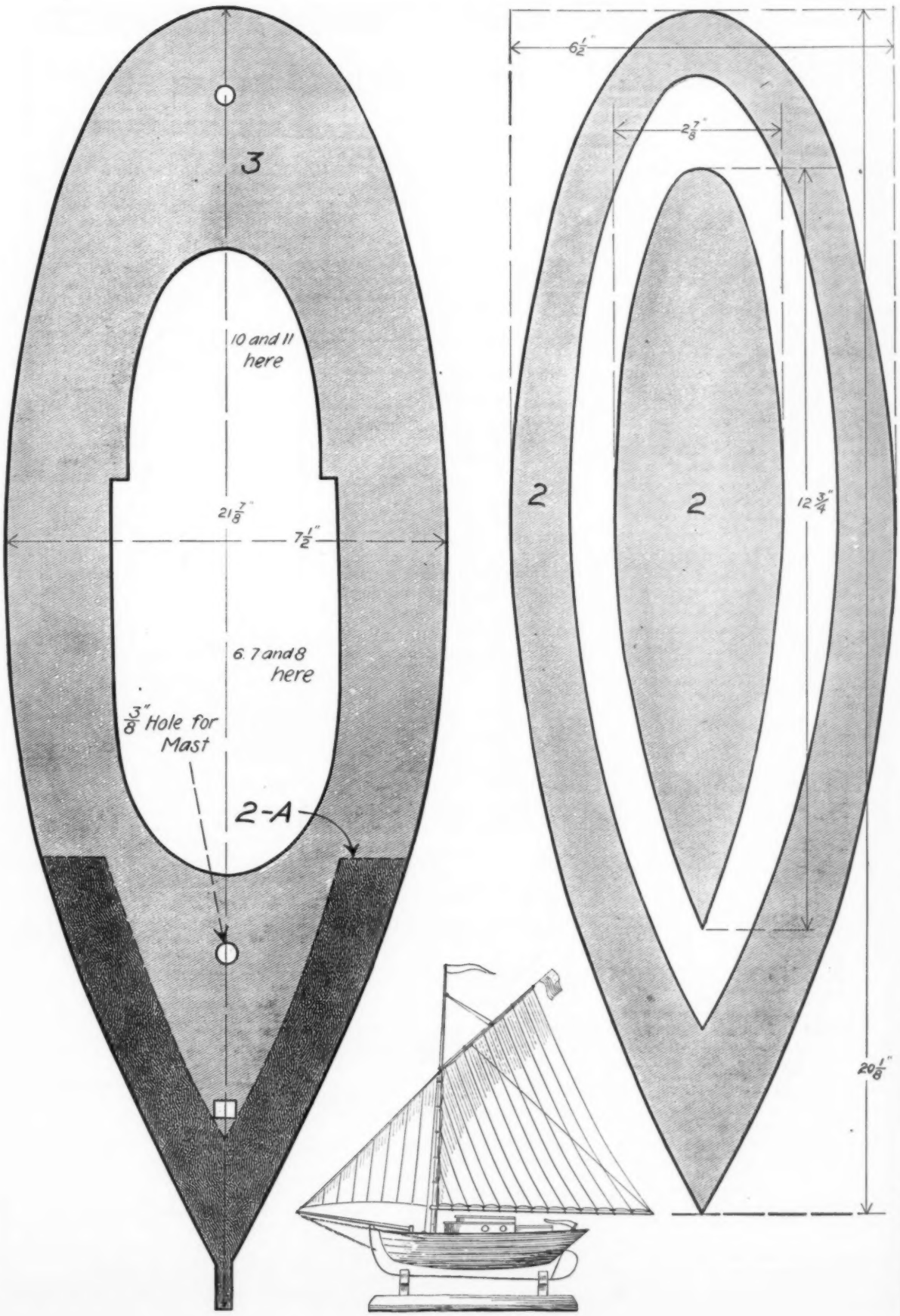
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2 7/8"
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2
12 3/4"
20 1/8"

The Avenger from the Skies

(*Continued from page* 18)

of the cattle, the sheriff's Fokker came alongside. Dan saw Tom huddled in the cockpit with the sheriff. He flung up his hand and he caught Tom's wan smile.

Then he saw the sheriff's gun laid across the edge of the cockpit. The sheriff was gesturing. From the flip of his hand, Dan judged that he was being ordered to land. He deliberately grinned across at Dozer and waggled his wings. He saw the other pilot grin back at that, and he guessed that the other flyer was not a bad sort. Probably he was enjoying the sheriff's discomfiture as much as was Dan.

Now the longhorns were straightening out. Dan was holding his plane at a little more than a thousand feet above the trail. He wondered what had become of Dad's other riders? Monty, of course. Perhaps he had sent the cowboys to another part of the range? Or some of the riders were in the deal?

Dan's sureness of what he intended to do suffered a setback. He had his future action all mapped out with respect to Simons and Sheriff Dozer. But once those longhorns crossed the border to the southward, they were lost beef. He knew that.

What an excuse this Sheriff Dozer would have if the rustlers stole the herd under his eyes. The sheriff was chasing an accused murderer, wasn't he? A fugitive desperado who had kidnaped the mayor of Crosscut? Yes, the sheriff would have plenty of excuse for neglecting to stop a few Mexican rustlers from stealing cattle.

DAN'S hand tightened on the stick. His bombs were gone, but there was the Vickers loaded with "fire" bullets. He glanced down. The longhorns were strung out, a line possibly twenty across, and there were at least a score of Mexican drivers.

The trail to the border, where it passed the canyon, ran for three or four miles through a narrow valley. It passed up this same valley to the Carter range.

Dan's hope that the bombing of the Mexicans in the canyon would stop the drive or hold them up until he had finished with Simons was lost. The cloud of dust arising from the herd indicated that the longhorns were moving fast and in order. Once they had passed out of the valley and onto the plateau beyond, nothing could head them off.

The last of the longhorns were coming from the canyon in the drive that extended for nearly half a mile. Dan circled and flew over twice, dropping to a little lower altitude each time. The persistent sheriff in his Fokker and Sanderson in the camera plane stayed close on the "Eagle Longhorn's" tail. Perhaps the sheriff thought that Dan intended to heed his order and land.

Dan banked his plane about a mile in front of the herd. He was showing 500 feet on the altimeter. He shoved the stick until the plane was at a ten degree angle, then he gave the motor all it would take. In half a minute he had streaked over that mile, and when he met the leaders of the longhorn herd he was down to less than 100 feet, at an altitude which the Fokker pilot did not attempt.

Ahead of him along the valley, as far as he could see, the trail was a mass of heaving horns. Dan shivered as he thought what it would mean to crash in that moving mass. But he did not let the feeling prevent him from spotting a Mexican rider when he popped into the sight rings of the Vickers gun.

NEW YORK AIRCRAFT SALON

Madison Square Garden

May 3—10

Do not forget the aviation show, which is being held at Madison Square Garden, May 3 to 10 next. Every boy's dream of everything in the line of aviation will be on display.

Models of the contests held in conjunction with the Salon will be on display also. There is no entrance fee for the contests.

Members of all clubs, private, school, Boy Scouts, Y. M. C. A., or any other organization or aviation club are eligible to enter the contest.

Help to make the Show a success—so be sure to visit it.

The burst of "fire" bullets laid an arc of smoke across the leaders of the longhorns. At the end of that arc the Mexican's horse reared straight up, pawed at the air, and fell over backwards. One burst was all that Dan had time for. He straightened out, but the plane had dropped so close that it seemed the landing wheels must graze the steers' tossing heads.

Dan zoomed out of the valley, banking as quickly as the plane had its feet in the air. He came back over, and as he did, he narrowly missed colliding with Sanderson in the camera plane.

Good old Sandy, thought Dan. Whatever happened, he knew he would have one friend on hand at the finish.

Dan looked down. Pandemonium had broken loose at the head of the herd in the narrow valley. Already excited by the bombing of the shack in the canyon, the leaders of the herd had become more frightened at the darting plane and the streaming burst of the Vickers gun. They were trying to double back on the line behind, a few breaking away to one side and attempting to climb the steep hill.

The streaming "fire" bullets kicked up the dust of the trail, the acrid powder smoke assailing the nostrils of the maddened animals. Dan saw a scared Mexican rider spur his horse up the steep side of the valley. Dan held a level stick, the plane roaring straight over the backs of the longhorns. He knew that if he could stampede the steers at the tail of the line the Mexicans would be powerless to stop them.

Dan disliked firing into the herd, but this was no time to be softhearted. He pulled the trigger ring of the Vickers when he had the tail-enders of the longhorns in the sights. He continued to hold the chattering gun's flame-spitting muzzle down until the sight rings picked up the group of Mexican riders coming along behind the herd.

ONE flashing glimpse of dark-faced men falling sideways from their horses or leaping stiffly upright out of their saddles, of plunging, whirling cattle, rearing and climbing over each other in their frenzy of fear, and the scene was gone—passing under the swift plane.

And Sanderson? Quick to sense Dan's object in stampeding the herd, he put throttle to his motor, rolling the big camera plane heavily along in the wake of the "Eagle Longhorn." He was not so close down as Dan had been, but he was close enough to put the finishing touches to turning the line of longhorns.

For the third time Dan roared down upon the herd. But this time he did not have to use the Vickers. The stampede was on and it was a veritable stampede of death. Turned back, the longhorns were plunging in a solid mass through the confines of the valley. They surged in waves up the sides, some being trampled, but all racing to escape that blazing air monster that had terrified them.

And the Mexican rustlers? Dan was almost sickened by what he saw. Some of the riders had disappeared under that thundering surf of hoofs and horns. Three or four were fleeing, scrambling up the slopes, their horses down and swept away in the flow of the death stream.

Again and again Dan circled. There was no stopping the backward drive of the cattle. They were headed for the home range now. Perhaps they sensed it. With Dan's and Sanderson's planes hovering over them like huge birds, Dad's cattle were going home. (*Continued on page* 46)

$1000 IN PRIZES - 165 AWARDS - HONOR CERTIFICATES

$1000 IN PRIZES - 165 AWARDS - HONOR CERTIFICATES -

Win This Trophy and $100 In Gold

Famous Folding Wing Fairchild 71

New kits include Balsa Prop, Wing Ribs, Framing Readicut. 3 Models in 1. Wheels, Pontoons, Skis.

Here's a Class 1 Contest Model. The most popular Champion Model we have ever advertised. There will be $20 in prizes awarded every three months to builders of this model with entry credits to be added together to determine Grand Prize winner. It is a 2-foot realistic model of the Fairchild 71—with FOLDING WINGS, workable doors, cellophane windows, pontoons, skis and wheels, just like the original, to fly R. O. G., R. O. W. or R. O. S. (rise off snow). Landing equipment interchangeable to suit flying conditions. Wings adjustable as well as folding, so centers of pressure and gravity coincide and assure long, stable flights. FULL-SIZE BLUEPRINTS prepared by professional draftsman. Material furnished in contest form. Directions describe and comment on each construction step. Eye-arresting model with its neat lines, orange wing and black-trimmed fuselage. Those who have received this model praise the quality of materials furnished and its beautiful appearance. Wing span 24". Chord 3⅜". Length 17½". Height 6". Weight ¾ oz. Champion's new rubber motor, balsa, glue, dope, bamboo, fittings, finished balsa prop and blank for carving contest prop, wing ribs, framing readicut, blueprints, directions, complete kit in strong mailing tube for safe delivery. A $5 value sold direct to you postpaid Canada $2.20. U. S. postpaid . . . **$2**

Lindbergh's New Lockheed The Dog Star

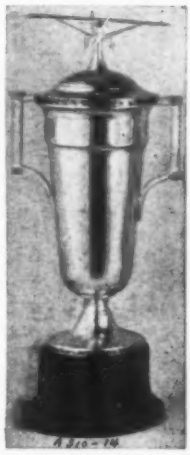
Scaled directly from Engineering Drawings furnished by Manufacturers. Be the first to have one.

This Class 1 Contest Model will be the most popular plane for 1930. It has been scaled direct from plans furnished by the manufacturers. In the Deluxe kit the model is covered with featherweight airplane silk. Celluloid N. A. C. A. Cowling, pants and landing gear are furnished. In the other kits tissue is used for covering. FULL SIZE BLUEPRINTS are included. The finished model has the black fuselage, orange-red wings and gold strip of the original. Its streamlined, neat appearance will make it the envy of everyone who sees your completed model. Using Champion's featherweight construction methods, you should obtain plenty of duration flights. $10 and $5 kits have 4-foot wing span. Insignia furnished includes "N-R-211" and Lockheed trade-mark. Every important detail reproduced, so that you have as near a scale model as it is possible to make that will have outstanding flying characteristics. The streamlined pants give it a racy appearance. The cowling and rounded, cigar-shaped fuselage heighten this effect. Champion's new rubber motor, U. S. Navy specification balsa, metal parts formed, blueprints, directions, everything complete, Deluxe kit $10. Tissue-covered kit $5. 2-ft. tissue covered model $2. All postpaid, U. S. Canadian orders and west of Denver, Col., add 50c for postage.

De Luxe Silk Covered Construction $10

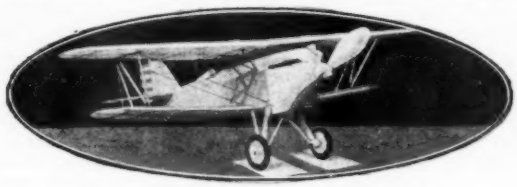
Tissue Covered Construction Kit $5

2-ft. Kit complete $2



The Big First Prize Silver Aviation Trophy

See our four-page advertisement in the April issue of Junior Mechanics and Model Airplane News for details. Or send 10c for 32-page catalogue with complete information and enrollment blank for this trophy and $100 in gold first prize.



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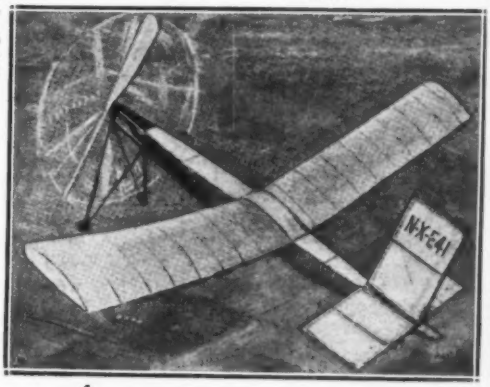
Contest Class 2 model. Beautiful colored scale model you will be proud to own. Olive drab and yellow dopes furnished same as used on original Hawks, except thinned down for model use. Cockpit streamlined headrest, imitation exhausts, synchronized machine guns, staggered, adjustable wings, army insignia in colors, detailed blueprints, all complete.

To be covered with superfine Jap tissue, Canada $3.30 postpaid. U. S. postpaid..... **$3**

To be covered with Jap silk, thistledown weight, Canada and west of Denver, Colo., $5.50. U. S. postpaid..... **$5**



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Contest Class 1 model. 1¼-ft. FLYING cabin reproduction of Lindbergh's cross-Atlantic monoplane. Finished all over in BRILLIANT SILVER LUSTRE. Nothing like it on market. 90-second flight reported by New York purchaser. Dozens of others have qualified for Merit Certificates. Realistic reproduction, even to "Lone Eagle" at controls. Tough 18-in. Mitsch fibre wing and 12-in. fuselage withstand any crash. Weight 1½ oz. Simple A-B-C assembling outfit anyone can put together successfully, as all parts numbered. No tools needed. 6-in. fibre prop, readicut wood struts. Clark "Y" wing ribs, 1½ in. disc wheels, detail drawings, pictures, full directions—all COMPLETE in mailing tube; postpaid Canada $1.20. U. S. postpaid..... **$1**

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Be the First to Fly these New Models

All kits and supplies guaranteed to satisfy, or for any reason within 5 days may be returned and your money refunded.

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Box 316, Chillicothe, Ohio.

Gentlemen: I Enclose $..... for which send me, right away Model kits I have checked below:

- ☐ Fairchild Folding Wing.....$2
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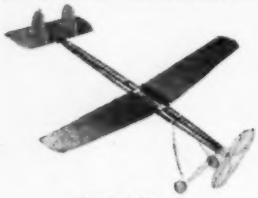
"Boys of today have a great future before them, for whether they take up aviation as a career or not they will undoubtedly live in an age when airplanes and flying will be to America what automobiles are today. I am glad to see so many thousands of boys interested in flying and constructing and using model airplanes. Model airplanes not only provide a lot of fun, but they are an excellent means of studying the principles of flight. Model airplanes are now made with great care and craftsmanship, such as the Kingsbury Silver Arrow Flying Planes, which I have personally flown. These planes are expertly designed and constructed, and besides providing a lot of fun, their realistic flight action contributes a great deal to a boy's study of aviation." Signed: Charles S. Jones ("Casey" Jones).

HERE'S THE SILVER ARROW!



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Dual Control Rudder

In 193 recent test flights out of 200 the Kingsbury Silver Arrow Flying Plane outflew all others, regardless of price. Most sensational plane in years. A proved success. Not a construction toy but fully built. A moment to assemble and it's ready to fly! Made of Balsa wood and aluminum; aluminum propeller; adjustable wings; strong elastic motor. Five models. Racing types—No. 1, wing spread, 18 in. $1.; No. 2, wing spread, 26 in. $2.; No. 3, (dual rudder) wing spread, 33 in. $3. Cabin types—No. 21, wing spread, 22 in. $2.50; No. 22, wing spread, 26 in. $3.50. (West of Miss. $1.10, $2.20, $2.75, $3.30, $3.85). If your dealer cannot supply you, send your order to us. Join Silver Arrow Club and become a Master Pilot.

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FREE! Kingsbury Moviescope! Twirling the leaves of this novelty book reveals a motion picture of Silver Arrow flying. Also shows 50 interesting Kingsbury Motor Driven Toys.

(*Continued from page 44*)

Down the trail from the Carter ranch came a dozen cowboys. Swooping low, Dan recognized them for Dad's riders. He watched them separate, letting the longhorns go through. Their first wild stampede over, the cattle were settling down to a steady homeward drive. Dan saw the riders falling in behind the herd.

Where was Monty? If he were with the riders, had the changed situation rendered him powerless?

The questions flitted through Dan's mind. Well, he could not worry about that now. Dad's cattle were saved.

Dan glanced back at Simons. His captive was showing signs of recovering from the daze into which this wild flight had thrown him. Dan's lips twisted into a grin again.

"You ain't seen nothing yet," he whispered to himself in bad grammar, his thought directed at Simons.

Then he remembered that Tom was in the sheriff's plane. That brought a frown to his brow. His half-formed plan to rid himself of the sheriff until he could carry out the remainder of his scheme, had not taken Tom into account. In some manner he would have to get Tom out of the Fokker and yet not let the sheriff lay hands on himself or come to the rescue of the mayor.

Dan wished mightily that he might tell Sanderson something. But that was impossible. Still, Sanderson had a lot of sense. Dan would have to take a chance on Sanderson understanding what he was about to attempt.

Dan suddenly turned the nose of the monoplane straight for the meadows near the home ranch. It occurred to him that this was to be his first landing there, at least where Dad would see.

THE closely cropped meadow in which the ranch cows were pastured offered the smoothest spot. Dan shut off his motor to the idling point and glided down. When he was about 300 feet up, he banked as slowly as possible without losing headway. The sheriff's Fokker had been on his tail, now it crossed over, nose to the ground.

To the rear of the Fokker and somewhat to one side, Sanderson was bringing the camera plane onto its points. In the act of landing, Dan slipped his automatic pistol from its holster. Sanderson's plane hit the ground a hundred yards or more away. The Fokker was another fifty yards to one side.

Dan counted on the sheriff having to get Tom out of his own crowded cockpit before he could alight himself. The Fokker was set down almost at the same instant that Dan's wheels touched the ground. Dan sensed rather than saw Simons begin to struggle with the strap that held him in the plane. He turned on him swiftly, the automatic laid over the rim, the black hole of its muzzle within a foot of Simons' head.

"Sit tight!" ordered Dan. "One move out of you and I'll let you have it, so help me."

Simons' fumbling hands dropped from the strap. His eyes widened with fascinated interest in the unwavering muzzle of the pistol. Perhaps Simons wanted to believe that Dan would not dare shoot him now, but after a quick glance at the boy's blazing eyes, decided to take no chances.

"They've got you anyway," he gasped out.

"Maybe," snapped Dan.

DAN watched the sheriff's deputy climb quickly out of Sanderson's plane. In the next few seconds the sheriff almost pushed Tom from the Fokker in his own eagerness to get on the ground. Still shoving Tom ahead of him, he started running across the field. On the way to Dan's plane he had to pass the camera plane. Dan saw him almost hurl Tom off his feet as he thrust him into the deputy's hands.

The sheriff kept on coming. Dan waited until he was only about fifty yards away, then he dropped the automatic to the floor of the cockpit. He gave the motor the gun so suddenly that the plane seemed to leap forward, snapping Simons' head sharply back. The sheriff was taken by surprise, but he kept on coming, running in a futile effort to lay his hands on the taxiing monoplane.

He was so close that the flipping tail of the "Eagle Longhorn" threw dust in his face as Dan pulled the stick and zoomed. But he was in no position to chance shooting. Simons was between him and Dan. As Dan felt his wheels leave the ground, he could not resist the temptation to flip his hand in a derisive gesture. Sanderson saw the movement, caught the trick that Dan had pulled, grinned broadly and waved in response.

Again in the air Dan took his time. In wide circles he set a spiral around the pasture landing, watching the Fokker plane. He saw the sheriff go stumbling back to the Fokker. Dan was nearly a thousand feet up and still climbing when the Fokker again took off. Then Dan looked at his gas gauge.

Because he often used his own personal plane for long flights, Dan had had the "Eagle Longhorn" fitted with a reserve tank. Now he estimated that he still had nearly eight hours of flying time in his fuel supply. The Fokker, used only for stunting on the movie lot, had no extra tank and if it had a full supply when it took off from the Dawnart lot, it would not be good for more than another two hours.

If the sheriff's local pilot thought of that, Dan knew that he would not be able to find out anything definite from the worn-out gauge on the ancient Fokker. And if the pilot did think of his gas supply, and landed to replenish it at the Dawnart location, Dan intended to be far beyond pursuit before the Fokker could again take the air.

But, evidently urged on by the sheriff, the Fokker pilot flew directly toward Dan. Straightening out at around 2,000 feet, Dan set a course northward, passing over the town of Crosscut. On and on he held steadily, taking it easy and paying little attention to the clinging Fokker. With Tom out of the sheriff's hands, Dan was not particularly worried over what happened to the other plane.

MORE than an hour later Dan crossed a low mountain range. Beyond that he saw miles of flat desert, baking in the sun. Even at that altitude, Dan could feel the heat of the earth coming up. Still the Fokker was trailing and Dan kept his throttle down to prevent the swifter "Eagle Longhorn" from losing his pursuer altogether.

Then the thing he had been waiting for happened. He looked back and the Fokker was no longer on the line it had held above him. He had to twist all the way around before he saw it. The Fokker was going down and Dan knew the landing was forced. Dan threw back his head and laughed. He could not help it. The trick had been so easy.

Thinking of the stretch of mountains, the fact that the Fokker was several miles from the range and then the long miles that lay between the mountains and the town of Crosscut, Dan laughed again. He glanced at his prisoner. Simons' mouth had dropped open. He had seen the Fokker go down, but he had not guessed the reason.

With six hours of flying left in his own tanks, Dan banked and laid a direct course back toward Crosscut. The laughter faded from his eyes.

No planes were in the air when Dan arrived in sight of Minion Mesa and Boomer Valley. The tents of the Dawnart Company still showed white far below. At least Steinfeldt had not obeyed the sheriff's order to get out.

Dan went into a spiral and climbed to 5,000 feet. It was like him to feel sorry for Simons. Then he thought of all that this man had been responsible for and his heart hardened. At 5,000 feet he glanced back and made sure that the strap was well fastened on Simons.

Then he pulled the throttle wide, pushed the stick forward and dived. But he did not pull out of it. Instead, he held the controls in rigid position until the plane had turned completely over. The earth below suddenly became the sky, so far as the plane was concerned. Held in place only by their straps, Dan and Simons were looking down into space with the green valley and the brown bluffs doing a queer whirling dance.

Dan could not see Simons' face at this moment, but if he could, he would have seen fear like death itself had turned it gray.

Instead of completing what would have been an outside loop, the most difficult of all stunts, Dan reversed

I WISH BOB WERE HERE WITH HIS HARMONICA!
SO DO I!
MAYBE HE ISN'T COMING!
I HOPE HE DOES COME OR THIS PARTY WILL BE A FLOP
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You don't have to know one note from another to begin, for this book tells you just what to do and illustrates each easy step. In a few minutes you can play the scale and the simple melodies shown in the book. And soon you'll be amazing your friends with the way you can reel off popular airs.

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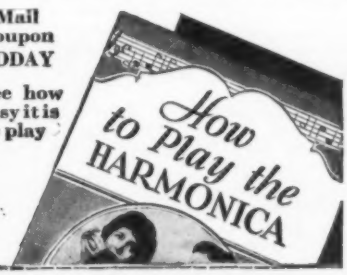

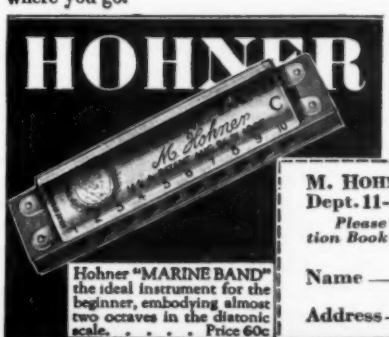

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the circle in bringing the plane back to a level keel. Once more he climbed. Up and on up, until 10,000 feet showed on the board. Then closing the throttle, he let the "Eagle Longhorn" hang for an instant poised at two miles high before he pushed the stick and went streaking down.

Alternately kicking right and left vertical rudders, Dan threw the plane into a dizzy zigzag that almost snatched the breath from his own air-seasoned lungs. During the death defying plunge, Dan caught a glimpse of another plane in the air, a Fokker. That would be McKelvie, back from his trip to Hollywood and Los Angeles.

OUT of that zigzagging, falling leaf dive, Dan pulled up so sharply that the wings strained and crackled. He was level with Minion Mesa and a minute later the "Eagle Longhorn" rolled to a stop.

Dan wasted no time. He unbuckled his strap, snatched the pistol from the cockpit floor and turned on the senseless heap in the rear cockpit. As Dan chafed Simons' wrists and twisted his head, the mayor came back to life. His eyes as he looked at Dan were glazed dully. It was certain that Simons had not expected to find himself alive after the plunge that had driven his breath and senses out of him.

"Now," said Dan. "It's going to be your turn to talk and talk fast. You've got one minute to loosen up. I'm going to write down every thing you say and you're going to sign it."

Simons looked at him as if he did not half comprehend.

"First," said Dan, his words drawn out and studied, "I want you to tell why the receipt for $6,000 you had given my father was among the papers Tom Calloway took from your desk the night you sent him in to rob your own bank. Why was that receipt in your desk?"

Simons started, instinctively raising his hand to the inner pocket of his coat. Dan had hoped for just that. If Simons had not destroyed the receipt, it would be on his person, not in his desk.

Simons saw his mistake before his hand had touched his pocket. But he was too late. Dan caught him and jerked him forward on the strap. He pulled a worn leather wallet from Simons' coat pocket. It bulged with papers. Scattering the papers on the floor of the cockpit, Dan came to his father's receipt.

If the thought of letting up on Simons had been in Dan's thoughts, that receipt wiped it out.

"Now repeat as I dictate," he rapped out.

The mayor shut his lips stubbornly.

Dan closed his notebook and turned back into his seat.

"Your choice," he said quietly. "You think you've been through something. We'll see what five miles up will do, if the gas holds out. And if it don't, it'll be just too bad for both of us."

"Oh my—," gasped Simons. "Go on, write, I'll sign."

Ten minutes later Dan set the "Eagle Longhorn" down on the Dawnart location lot. He was aware that many persons besides the members of the film company were crowding out onto the field. Probably there would be plenty of Sheriff Dozer's deputies there to arrest him. Well, let them. It did not matter now.

When the landing wheels touched and the plane rolled to a stop, Dan's hands dropped from the stick. He felt almost as limp all over as the cringing Simons looked. But inside a glow of satisfaction reacted to keep his head erect.

In his pocket was the receipt for $6,000 that had been stolen from his father by Monty, the foreman, and turned over to Simons. And on the torn leaves of his notebook, signed on each with Simons' name, was the complete confession of the plot to steal Dad's cattle and seize his ranch.

Then there was the part that freed Tom of all blame for the robbery of the Crosscut bank, and implicated the sheriff as having got his split from the fake robbery. Dan looked down on the rows of faces that were rather blurred in his vision.

Probably that tall, broad shouldered man pushing his way past the others was one of Dozer's deputies coming to drag him out of the plane. All right, he thought, it did not matter.

But when Dan saw the shining gold badge on the tall man's vest, he wondered. He did not know that sheriff's deputies wore gold badges. Behind the tall man came Steinfeldt and Sanderson and McKelvie and his Dad. And there was Tom, handcuffs on his wrists, in the hands of a deputy, the man who had been in Sanderson's plane.

"Guess you'll have to climb out, young fellow," said the tall man gravely. "Seems there's a few things that'll have to be looked into."

DAN caught a glimpse of his father's set face, with the deep wrinkle of trouble between his eyes.

"Yep," continued the tall man, "you've got a lot of explainin' to do, young man. I'm told you're charged with bank robbery, murder, kidnaping a public official, bomb throwing and several other things. Maybe some of them can be explained, but it looks pretty bad."

Dan got wearily from his seat. He arose, his hand fumbling in his pocket. Without a word he handed a bunch of paper slips to the tall man.

"What's this? What's this?"

The man's eyes swept quickly from leaf to leaf that had been torn from the notebook. At the bottom of each he saw the scrawled name of Simons.

"And this—this man back here is Simons?" he queried, his thumb indicating the huddled figure.

He turned and handed the papers to Steinfeldt and Dad.

While they were reading he was getting the limp Simons out of the strap.

Things happened so fast that Dan could only hang onto Dad's gripping hand and listen.

"United States marshal," Steinfeldt was saying. "Friend of mine—had a talk with your father. Dan—got the idea there was something about this town of Crosscut that would bear looking into—McKelvie brought him."

Dan saw the marshal push the sheriff's deputy to one side, after he had taken his key. He unlocked the handcuffs on Tom's wrists and drew Simons' hands together in the steel circles. And then Tom was standing beside him and Dad was saying, "'Spect now I'll have one boy at home, anyway. Got to give this young fellow a chance, haven't we, Dan?"

Sanderson and McKelvie had been pounding Dan's back until his shoulders ached.

"GOIN' to build a shed up at the home place for your flyin' machine, Dan, so's you can drop in most any time. Never thought I'd live to see the day one of them things would be put to herdin' cattle." It was Dad's great concession.

And then Dan learned that the crooked foreman had been among the Mexicans driving the cattle when the stampede started.

In the exciting clamor of voices, the swiftly changing situation, something had been forgotten. It was Steinfeldt who thought of it.

"Dan," he asked, when he could be heard. "Where's the sheriff?"

Dan's lips twisted into a slow grin.

"Him? Well, if he hasn't run onto some desert fillin' station, I guess he's about 200 miles out an' walkin' home."

THE END

Graf Zeppelin Plans

(*Continued from page* 19)

1/16" x 12" cut the five little "props" and pin one at rear end of each of the motors.

The Zep is now ready for painting. Use a good brush. One coat of silver paint is enough. Apply evenly and smoothly.

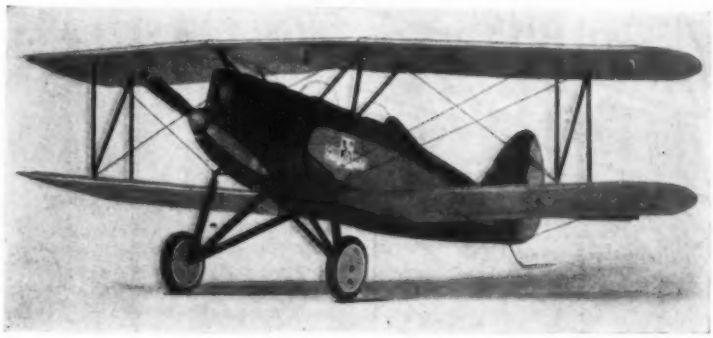
The control cabin is all white. Use India ink to outline the windows and door.

The propellers are silver and motors black.

Outline the fins, rudder and elevator in black lines. After this is done, paint "Graf Zeppelin" in bold lettering on both sides and L-Z-127 in its proper place.

The Zeppelin is now complete.

Great Lakes Flying Model



The C. M. & S. Co., 20" span exhibition and flying Great Lakes Sport Trainer model (wt. 1 oz.) with scale propeller attached

Which You May Now Build

The above is an unretouched photograph of our ¾" scale flying model of the famous Great Lakes Sport Trainer 2T-1 that made 34 consecutive outside loops, 19 of which were under official observation—a record still unparalleled—to say nothing of its many other achievements.

You may now build this model to look as beautiful and as natural as the real ship—even to the colored name plates on the fuselage sides! It is one of the world's most beautiful flying models, built closer to scale than any other flying model produced anywhere. And what's more, it will fly like a pursuit ship for a remarkable distance. We will not say how far, but we'll let you tell us when you have completed your Trainer model; and you'll be satisfied. The above (and the one below, too,) is *not* a photo of a special built model, but built according to our large standard full-size drawings, just like you'll get in your kit.

This exceptional model is the result of many months of intensive research work on the part of the engineering staff of the Cleveland Model & Supply Company, in which they have originated and standardized the use of the ¾" scale for scale flying model airplanes with its many features.

Features

1. Large drawing of model is full size on extra heavy paper (34" x 44" sheet). It is used as a layout sheet, has full-size patterns which may be cut-out, it has numerous photographs of covered and uncovered models and parts and contains for building and flying, detailed "meaty" instructions of approximately 5,500 words. This is equal to 25 or more pages of reading matter in the average textbook on model construction.

The drawing may be neatly kept in a ring binder with the many others we are now preparing for you.

2. All wood parts are balsa, no bamboo employed.

3. Every possible detail reproduced, including real celluloid windshields, hollowed headrest, gas gauge, intake and exhaust manifolds, motor cowl air louvers, streamlined struts, scale wheels, etc. Best of all, they're not hard to make as our drawing, photographs and instructions clearly explain how to make them.

4. Nose simple to build. It is supplied partly finished and numerous photographs show its seven easy steps of construction clearly.

5. All construction simplified so it may be built on a "kitchen table" workshop. Only the simplest tools are required which every aeromodelist has.

6. A highly efficient wing section employed.

7. Movable and adjustable control surfaces. Removable wings, motor spar, rubber motor and propeller. Nose snaps off for winding.

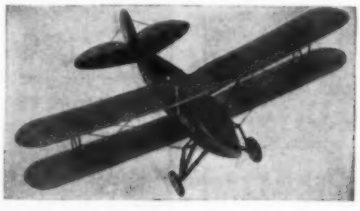
8. Wings do not slide back for balance but remain in one position.—It always looks like the real airplane. Washin and washout may be altered instantly for more or less lift when necessary.

9. Colored like the real airplane, the true international orange and black combination applied with the use of patterns cut from our pattern sheet.

10. Well stressed—The highest strength-weight ratio possible in model airplane design.

11. It strikes obstructions at full speed without crashing.

12. Weight complete, ready to fly between 1 and 1½ oz. when constructed with our special kit. This kit should not be confused with any other for this airplane as there is only one Cleveland designed Great Lakes Sport Trainer model.



This is the most complete kit ever offered to aeromodelists (those who have had previous model airplane experience) anywhere. We emphatically advise *beginners against* attempting construction of the Trainer but to start with our simpler models to acquire experience. (Catalog 10c postpaid. Contains information and instruction for building advanced scientific models.)

Introductory price of the Great Lakes Sport Trainer kit with drawing for a limited time only $4.75, packing and postage 20c extra. In other words, it will be sent to any part of the world for $4.95. We reserve the right to withdraw this offer at any time. The regular price of the kit is $6.25, as the drawing alone costs $4.00.

This is not clever advertising copy but actual facts listed together. Everything guaranteed to be just as represented or your money refunded.

There has never been a model kit to equal its value on the market before. Do not confuse it with any other.

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A Course in Airplane Designing

(Continued from page 27)

little center of pressure travel as possible. If the airfoil is to be made light yet strong it should have a thick section, so that it can contain deep spars, or perhaps two spars, without being so thick that it increases the drag to a pronounced degree. Then, as I should have stated before, the wing should be comparatively easy for you to make.

For model work, a wing with a cambered lower surface is difficult to cover, so it is therefore best to choose one that is flat on the bottom.

Looking around in the airfoil section data prepared by the National Advisory Committee for Aeronautics, we find that the old reliable Clark Y suits our purpose admirably. It is moderately thick, easy to build, has a good L/D ratio, and has comparatively little center of pressure travel.

The more advanced model airplane builder may wish to experiment with other airfoils, perhaps even some of his own design, and I heartily commend this procedure. We can all learn a great deal through experiment.

HAVING chosen our airfoil section, we have next to decide whether the ship shall be a biplane or a monoplane. Shall we take advantage of the shorter wing spread afforded by the biplane, or shall we succumb to ease of construction and build a monoplane? That is a problem.

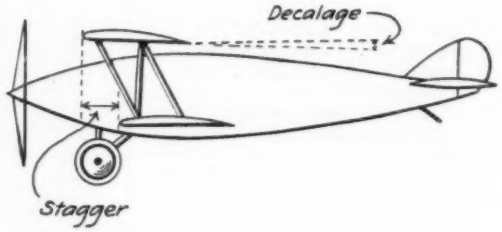
The monoplane is certainly easier to build as a model, but the biplane can perhaps be made stronger in proportion to weight, if built by an expert. The tapered wing monoplane, however, can be made very strong, and has fewer, if any, struts exposed to the air stream. So I leave you to decide for yourselves the question of biplane *versus* monoplane, a question that is as old as flight.

What form shall we use for our wings? This matter depends largely on the ship. Tapered cantilever wings are coming into favor at present. A cantilever wing is one that is supported at one end only, with no outside bracing struts, as shown in Figure C.

In a cantilever beam, there is not as much strain on the outer parts of the beam as there is on those parts nearer the point of support, since the parts nearer the support have to sustain not only the weight applied to them directly, but also that transmitted by the outer portions. That is the why of the tapered wing.

It is made thicker and therefore stronger near the fuselage, the support, where the greatest strain occurs. Doing this also aids the stability of the ship. There are, however, many other forms of wing construction, and some of them are probably just as efficient as the tapered form, when used correctly.

Figure D



If we are going to build a biplane we will need to have an understanding of some of the more important terms used in biplane building. As you probably know, stagger is the amount of overhang of the leading edge of the top wing over that of the lower wing, when the ship is in a horizontal position.

Stagger is used to cut down multi-plane interference, which decreases the efficiency of all ships having two or more wings, one above the other. The method of measuring stagger is shown in Figure D.

Another term often used in biplane construction is *decalage*. This is really a difference in the angle of incidence of the two wings. As shown in Figure D, the top wing may be set at a greater angle of incidence than the lower one. In the figure the top dashed line is drawn parallel to the chord line of the lower wing, while the other dash line is a continuation of the chord line of the top wing.

That should give you a fair understanding of the basic facts of wing design. Now try yourself out on these questions:

Questionnaire

1. What things do we want in a wing section for use on a model airplane?
2. Name some advantages of the tapered wing. Why taper the wing?
3. What is stagger?
4. Explain the meaning of the term decalage.
5. If you were designing a model that was intended to fly for long periods of time, yet had to be stored in a small space without dismantling, would you make it a biplane or a monoplane? Why?

Wings of Valor

(*Continued from page 6*)

"Did you see who was in it?"

"Sure," said Jimmy. "I don't know him, but I'd recognize him anywhere. He had a peculiar scar on his cheek."

"Well," said the super. "There's only one thing to do; and that's to notify the police."

He reached for the telephone, but Jimmy's outstretched hand stopped him.

"Don't, super," said Jimmy quietly. "Leave the police out of this. At least for a while. Think of Dad. If these crooks thought that the police were on their trail, they'd take it out on him."

THE super nodded his head in agreement, then waved his hands in a futile gesture.

"But what can we do?" he asked helplessly. "We can't simply sit tight and hand over ten thousand dollars. Even if we do, what guarantee have we that these thugs won't double-cross us?"

Jimmy remained silent for a moment, his tanned brow wrinkled in deep thought. At last he spoke.

"I have an idea, super, that I think I can put over. Give me a chance to try it. We'll wait for that ship to fly over tonight with the instructions. I'll have the mono tuned up ready to go. As soon as he's over, I'll follow him."

The super considered this for a moment, then shook his head.

"No, son," he replied. "It's a police case. I've lost one man already. I can't afford to lose two."

"I'm pretty hard to lose," argued Jimmy. "And you must see that it's the only way. What good can the police do? They won't know where these crooks are hiding out. But if I follow them, I'll find them, if nothing else."

The super began to protest anew, but Jimmy cut him short.

"Listen," he said grimly. "If you won't let me go officially, I'll go anyway. He's my Dad, and I'm going after him."

"Well," said the super reluctantly. "If you put it that way—"

"I do put it that way," retorted Jimmy firmly.

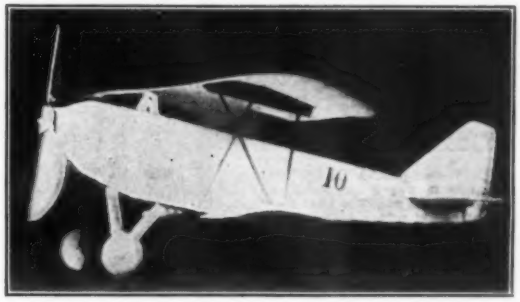
Jimmy, his anxiety and loyalty aroused, is ready to start on his search for his dad. What dangers beset him on his quest—or does all go smoothly, as he hopes? Read the next installment and learn what stirring adventures lie in store for this daring young flyer.

GLIDING FROM A to Z!

Here we are—the world's most thrilling sport set out for you in understandable language. Don't miss your MODEL AIRPLANE NEWS in which will appear the A. B. C. of gliding—which means everything—by Percival White.

First article in the July issue!

Something Different—And How It Flies!



Looks like a real plane, doesn't it? Both this and the picture below are unretouched photographs.

Something different—a biplane instead of just another monoplane! One of the most realistic models on the market, and one of the easiest to build.

This little model of an army fighter will be the envy of every boy in your neighborhood. It has a wing span of one foot and weighs only a quarter of an ounce! It will rise off a floor or sidewalk and come down again to a perfect landing. Because of its light weight it is not apt to be damaged if it strikes a wall while being flown indoors. In bad weather you can fly it in any large room, and when flying conditions are good you can take it outdoors again. And it will really get up and *fly*—not just glide or flop around. It is guaranteed to do from sixty to one hundred feet. The duration is about twenty seconds.

The Logan Toy Works,
35 East Gay Street,
Columbus, Ohio.

Dear Sirs:

I am glad to have had a chance to see your little biplane. I have been building models for about two years but this is the most interesting little set I have had.

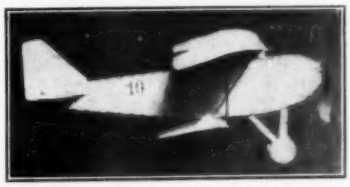
I found it very easy to build. I think your idea of simplifying construction is a good one because it will keep so many boys from wasting their time on sets that take experts to put together.

The little ship is very good-looking and flies fine. Seventy feet is all it has done yet, but I know it will do almost twice that when I get it adjusted.

Yours truly,

Jack Williams,

207 Brunson St.,
North Munson, Ill.



(This set is suitable for boys of 14 or over, or younger boys with model-building experience)

In spite of the fact that this model will out-perform many costing from two to five dollars, it is remarkably easy to construct because there is no delicate, complicated, tedious framework in the wings, tail or fuselage.

The wings and tail surfaces are cut from sheets of stiff papyronoid paper, and all you have to do is cement them to the fuselage, which is made of the same material, and which is just as easy to make. Cement the sides together, fasten a few braces in place, and the job is done. An expert can have a finished model in forty minutes, while anyone should be able to do the work in an evening. Many other scale models take days or even weeks to assemble.

The frameless construction is based upon the idea used in Col. Lindbergh's wonderful new Lockheed Sirius, except that papyronoid is used instead of plywood.

The construction set includes everything needed to build the finished model:

Wing and fuselage material
Three-quarter inch disc wheels
Axle
Aluminum propeller
Propeller shaft
Propeller shaft bearing
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Bamboo struts
Detailed drawings and clear directions
Flying instructions

The set is packed in a sturdy container which prevents damage even under rough handling. And you get it all for eighty cents!

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Enclose 80c with your name and address and your set will be mailed to you, postpaid in the United States, Canada and Mexico. We cannot use stamps or fill C. O. D.'s. Check or money order safer than coin.

If you are not satisfied with your model after you have constructed it we will refund your money. Use this coupon if you care to.

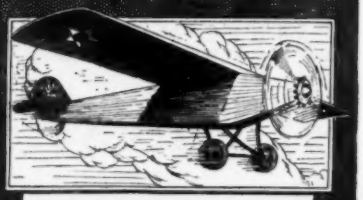
Gentlemen: For the enclosed 80c send me your Army Biplane set.

Name.....

Street.....

City.....State.....

The MOCAR



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When completed this plane will fly beautifully, R.O.G. or launched from the hand. The plane has a wing spread of 18 inches, fuselage 12 inches. A very powerful rubber motor, ball-bearing propeller of special, one-piece blade construction and rubber-tired disc wheels. All parts are made of aluminum. Modeled after Lindbergh's Spirit of St. Louis. It is strong and will stand considerable abuse. Price $1.00 at your dealer or postpaid.

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How to Build a Sail Boat

(*Continued from page* 39)

cabin. Cut from one-quarter inch wood.

8 is the cabin superstructure. Cut from one-half inch wood.

Cut one No. 10 from 1/2" wood and one No. 11 of 1/4" wood. For the mainmast use a 3/8" dowel stick 28" long. For the bowsprit 3/8" dowel stick 11" long. For the top gaff 3/8" dowel stick 12" long. Taper your mast from the deck to 1/8" at the top. Do likewise with the bowsprit. Cut out your boom from 3/8" dowel stick 28" long. Screw in one end of the boom, 1/2" screw-eye. Use 5 ft. of 1/8" chain. Use 1/2" curtain rings. A good fishing line cord should be used.

For No. 12 cut four rings 1/8". This can be cut from the cover of a cigar box. These act as window frames for the imitation portholes to fit on cabin. A small piece of looking glass can be put underneath to act as windows. The looking glass acts as a reflector and catches the light.

Necessary Materials

5 sq. feet	1/2"	soft wood
3 feet	1/4"	soft wood
1 foot	7/8"	soft wood
9 feet	3/8"	dowel
5 feet	No. 20	chain
1/2 yard	No. 1-A	cotton (sails)
1 can waterproof glue		

Tools

1 scroll or coping saw
1 tack hammer
1 half-inch chisel
1 hand drill
sandpaper

How to Build a Douglas Mail Plane

(*Continued from page* 29)

Take the small exhaust pipes and space them 3/16" apart. Push these into the sides and be sure to let 1/8" be exposed. Do this on both sides of the fuselage. Now take the large pipe and place against the small tube and ambroid. Fill in the open parts of the tubes with ambroid. When this has been painted, it will not be noticeable. Be sure that both sides are exactly alike.

When this is dried, make a wire brace as shown in drawing and place it in its proper position. Then get a piece of tubing 1/4" long. Measure on the top part of the body 1-1/8". Push the tubing into the balsa until 1/8" is exposed.

Tail Surfaces

From your balsa wood 1/4" x 5" x 12", cut the shape of the rudder and elevator. These may be made movable if desired. Streamline these as shown in drawing.

Assembly

You are now ready to assemble the wings. Take the top wing and find the center of it. Mark it and cut in half. Now give it a dihedral, as shown in drawing, of 3/8". Ambroid it securely and set it aside to dry. Take the lower wing. Find the center and mark it. Measure 11/16" from the center and mark. Then measure 11/16" and mark the other side.

With a coping saw cut the wing apart. The small piece will not be used. The size of each wing is 9-5/16". Now take a strip of bamboo. Cut four strips 1" x 1/8" wide and push these into the two half wings as shown in drawing and ambroid them tightly.

Note that all bamboo struts should be streamlined with sandpaper. After these have dried, measure from the nose of the body 2-3/4" and mark. This is where the wing is to be placed.

Push one side of a wing close to the body and see if it fits well. Try the other side. If both fit, place in position and ambroid along the edge of the wing and to the body. Do this on both sides. Now slip the wings in flush to the body. Give it a dihedral of 3/8" and set aside to dry for two hours. After the lower wing is tight and secure, cut four strips of bamboo 1/8" x 2-1/4". These are for your cabane struts.

Push these in the top of the body and ambroid as shown in drawing. When these are dried securely, take the top wing which is already finished and place above the four cabane struts directly above—no stagger. Be sure that the wing is evenly set. Secure with ambroid. When this is dried, the gap should be 2-5/8".

Now cut two strips of bamboo 1/8" x 2-3/4" and two more 2-5/16". Measure 2-9/16" from the wing tips. Ambroid the two struts, that are 2-3/4" long in front, 3/8" from the leading edge. Take the two struts that are 2-5/16" long and ambroid these 1-5/16" behind the first one. Keep an eye on the drawing while this is being done. This now completes the wings. Now take two blocks of balsa, shape out and streamline the landing lights as shown in drawing and ambroid them in their proper place under the lower wing.

Tail Assembly

The stabilizer is ambroided into position as in drawings. Be sure that it is perfectly straight. A pin or two will take care of that. Now

ambroid the rudder upright and make sure that it is straight. Take four strips of bamboo, two 1/16" x 2-1/2 x 2". These are to be used as braces for the stabilizer. Measure 1/4" from the leading edge of the stabilizer and ambroid the 2-1/2" strip as shown in drawing in the bottom side of the stabilizer. Ambroid the smaller ones 3/4" behind. This is done on each side.

Landing Gear

Take two strips of bamboo 1/8" x 2-1/2" (bamboo is used because of strength). Push these into position and ambroid as shown in drawing. Now one-fourth of the length of these strips are in the body. Leave to dry for a while. Make the shock absorbers, as shown in drawing, of balsa and bamboo. Ambroid in place. Two more strips of bamboo 3/16" x 2-1/2" are cut and pushed into position and ambroided. Now ambroid them to the front strut. Let these dry. This is done on both sides.

Now take a piece of wire about 2" long. Ambroid it and secure with thread, as shown in drawing. Do this to both struts of the landing gear, the Pitot tube being slipped on. The Pitot tube may be made from a piece of wire and bent to shape as shown in drawing. Now ambroid to the first strut on the left side of the wing three-quarters up.

Wheels

You may now make the wheels, which are out of balsa block 1-1/2" x 1-1/2" x 5/16". Cut them out round and shape the rims and tire with sandpaper. With a 1/32" drill, drill a hole through both of them. Insert a wheel bearing on each side of a wheel and ambroid lightly.

Propeller

The propeller is made like the standard steel type, as shown in the drawing. A needle can be used for a propeller shaft. Make the blades of balsa and slip them into the metal hub. Now thrust them to the proper angle of 3/32" from the center and ambroid securely.

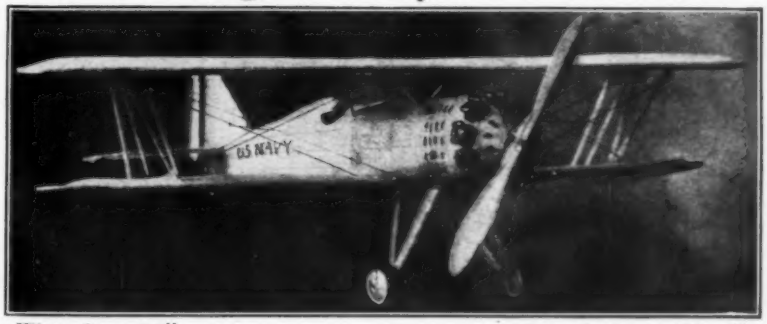
The builder may color his plane as he wishes but be sure to use special colored dope.

Models and Their Relation to Scientific Experiments

Owing to a last minute emergency it was found impossible to publish the above article by Prof. T. N. de Bobrovsky in this issue of MODEL AIRPLANE NEWS. The article, however, will be published in a subsequent issue.

THE EDITOR.

The Vought Navy "CORSAIR"

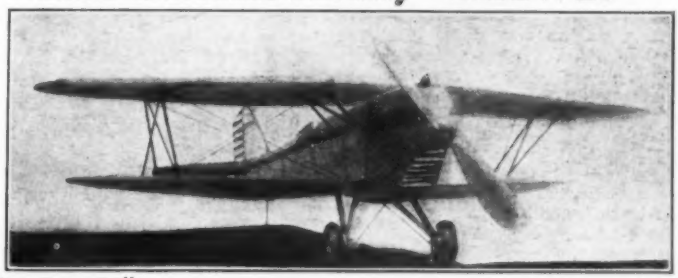


Wing Span 24" Length Over All 16"

Our improved construction set of this navy fighter now enables you to build it in a better and quicker manner. Our kits now include READY-MADE ALUMINUM PROP., a realistic MINIATURE WASP MOTOR, wood cut to size, wheels, wing tips cut to shape, insignia, paint, aluminum for cowling, orange dope, illustrated instructions, full-sized plans, etc. Imagine the experience you will gain, the thrill you will have, by building and flying this model. SEND IN YOUR ORDER TO-DAY!

COMPLETE KIT (Wasp motor and aluminum prop.).....$4.00
COMPLETE KIT (Minus motor and prop.).....3.00

The Curtiss Army "HAWK"



Wing Span 24" Length Over All 16"

The Curtiss Army "Hawk" is by far the best "buy" in the market. Yes sir! and it pays to build it from our construction set, which includes wood cut to size, insignia, wheels, Jap. tissue, special rubber motor, full-sized plans, fittings ready-made and many other parts.

COMPLETE KIT.....$2.50

OUR ILLUSTRATED CATALOG No. "FOUR"

Our new illustrated catalogs No. 4 are just off the press! Every one of them describes R. O. G. models that perform like nobody's business, outdoor models that stay in the air for 10 minutes or more, commercial models that fly like real ships, scale-models built and fly like the original planes, on the list including BOEING, RYAN, CURTISS, LOCKHEED, VOUGHT, etc. New sizes of supplies, crammed full of ideas!

COMPLETE ILLUSTRATED CATALOG NO. 4.....$ .10

INDEPENDENCE MODEL AIRPLANE & SUPPLY CO.
Dept. M FAR ROCKAWAY, NEW YORK

"Aviation Enthusiasts"

MODEL CLUB M3

MODEL CLUB PINS

Made in Silver or Gold Front $6.00 Per Doz.
Any Letter Can Be Applied to Pin to Conform with Club Name.

MODEL CLUB M5

MAKERS OF PINS FOR AMERICAN SKY CADETS AND N. Y. GRAPHIC J.A.C.

MODEL A CLUB M7

All Sorts MEDALS All Sports

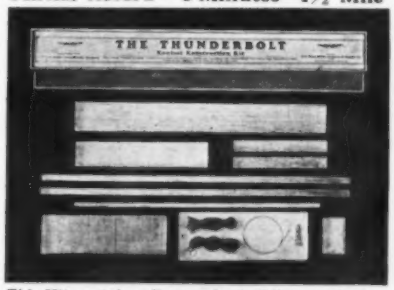
SCHOOL—CLASS AND FRATERNITY PINS

JOHNSON CO.

352 W. 13th St. "Wing Building" New York, N. Y.
Write For Catalog "G"

Twin Pusher Racing Model

Official Record — 3 Minutes—1½ Mile



This Kit contains all parts for building our famous Thunderbolt Model. It is very simple in its construction and we know it is the most consistent flyer ever developed.

THIS CONSTRUCTION KIT - - - $1.00
Plus 10c postage

Send for Our 40 Page In Color Catalog

FULTON TOY PRODUCTS CO.,
Dept. 102
312 N. May St., Chicago, Ill.
"Distributors of Red Wing Products"

Attention! Model Airplane Builders!

Great improvements have been made on our construction sets.

1. Ready cut propellers furnished to each set. (Eliminates the most feared work for the model builder).

2. Ribs, stations and other parts are printed right on the wood. (Saves the tiresome and difficult work of transferring the design from the blueprint to the wood).

3. Full size blueprints, showing front, side and top view, as well as many details.

4. Light weight celluloid wheels on land and amphibian types.

5. Nose and cowling blocks of the Curtiss-Army-Hawk are ready shaped.

6. For all above improvements, the price for our sets remains unchanged.

Think it over before you order a set elsewhere.

At the second annual Aviation Show at New York our booth was the center of interest for model builders.

Our lightweight scale models as well as our neatly boxed construction sets attracted considerable attention.

2 ft. Vought-Navy-Corsair constr. set $3.00
2 ft. Curtiss-Army-Hawk constr. set $3.00
2 ft. Sikorsky-Amphibian constr. set $2.75
2 ft. Savoia-Marchetti constr. set $2.50
3 ft. Lockheed-Vega constr. set $5.25
1 ft. National Moth, latest R. O. G. set .....$ .60

Full size blueprints, ready cut propellers and other improvements as above stated with each set.

Blueprints for 2 ft. Models, if ordered separate, 50c apiece, others 25c apiece.

COLORLESS AERO CEMENT, best ever made, per 2-oz. can, 33c postpaid. Try one.

Large 32-page catalog, describing many more construction sets and all high-grade supplies 5c postpaid. Immediate shipment of construction sets and supplies from stock.

National Model Aircraft and Supply Co.
29 Y North Avenue
New Rochelle, New York

The American Sky Cadets

(Continued from page 25)

Indoor Hand Launched

Senior Division

1. Harold Dennison, 18, Marion, Ind., 337 sec.
2. Joe Ehrhardt, 17, St. Louis, Mo., 302.2 sec.
3. Rurick Myers, 18, Chicago, Ill., 261.8 sec.

Junior Division

1. Kenneth Donzelot, 14, St. Louis, 261.3 sec.
2. Carl Fries, Richmond Heights, 220.5 sec.
3. Charles Herr, St. Louis, 185 sec.

Honorable Mention—Robert Licklider, St. Louis, 168 sec.

Indoor Hydro

Senior Division

1. Joe Ehrhardt, St. Louis, 162.5 sec.
2. C. Leja, 16, Chicago, 127 sec.
3. Ernest Marcouiller, 18, Chicago, 120 sec.

Junior Division

1. Andrew Madison, 14, St. Louis, 195 sec.
2. Ralph Kummer, 14, St. Louis, 77.5 sec.
3. None.

Commercial Senior

1. Casimer Leja, 16, Chicago, 146.2 sec.
2. Joe Ehrhardt, 17, St. Louis, 143 sec.
3. E. Marcouiller, 18, Chicago, 88.6 sec.

Commercial Junior

1. Charles Herr, 14, St. Louis, 163.0 sec.
2. Andrew Madison, 14, St. Louis, 43.0 sec.
3. Robinette Licklider, 14, St. Louis, 26.0 sec.

Special

1. Harold Dennison, 18, Marion, Ind., 380 sec.
2. Ernest Marcouiller, 18, Chicago, 262.8 sec.
3. William Whitman, 15, Memphis, Tenn., 259.4 sec.

Honorable Mention

Casimer Leja, 16, Chicago, 255.2 sec.
Kenneth Donzelot, 14, St. Louis, 224 sec.
Joe Ehrhardt, 17, St. Louis, 183 sec.

Exhibition Model Contest

1. Joe Ehrhardt, 17, Ford Trimotored.
2. Ernest Pinchert, 3849 Federal Place, Vought Corsair.
3. Willis Potthoff, 1540 R. R. Ave., Brentwood, Mo.

Honorable Mention

1. Woodrow Reyburn, 3738a Spring (neat workmanship).
2. Darwin Siegel, 5590 Pershing (proportion scale).
3. Edwin Stiff, 5824 Maple (ingenuity).

Highest Point Winner

Joseph Ehrhardt	16
Harold Dennison	10
Andrew Madison	8
Casimer Leja	8
Charles Herr	6
Kenneth Donzelot	5
Ernest Marcouiller	5

Many beautiful prizes and trophies donated by St. Louis individuals and firms were awarded the winners in this first annual national event.

Following is a list of the winners at the New York Aviation Show.

Scale Models

A. Dallas	1st
W. Welsch	2nd
N. Trimarco	3rd
G. Egner	4th

Construction Sets

M. Nussbaum	1st
M. Golder	2nd
John Stolzenberg	3rd
T. Boland	4th

Wood Models under 16 Inch Wing Spread

H. Marshall	1st
G. Jameson	2nd
J. O'Neill	3rd
A. Braun	4th
R. Karanza	5th

Gliders

(Queens)

Class A

1. Joseph McDermott.
2. Joseph De Maggio, 169—160th St., Jamaica, L. I.

Class B

Harry DiRocco, 233 Franklin St., Queens, L. I.
Burness Ross, 6435—68th Ave., Queens, L. I.

Rubber Motors

Class B-2

1. William Davis, 177-58, 105th Ave., Jamaica, L. I.
2. Joseph Weiss, 111-46 Lefferts Ave., Queens, L. I.

Rubber Motors

(Richmond)

Class B-1

Harry Salveson, 15 Van Brunt St., Eltingville, S. I.

Class B-2

Harold Weiler, 21 Albion Place, Richmond, S. I.

Rubber Motors

(Bronx)

Class B-1

Joseph Harris.

Class B-2

Charles Esposito, 2395 Hughes Ave., Bronx, N. Y.
Yale Mintz, 779 East 176th St., N. Y. C.

Gliders
(Manhattan)

Class A
1. Yale Pokress, 27 West 86th St., N. Y. C.
2. Louis Gordon, 235 West 75th St., N. Y. C.

Class B
1. Edward Beshar, 851 West 177th St., N. Y. C.
2. John Wynne, 318 West 67th St., N. Y. C.

Gliders
(Brooklyn)

Class A
1. Joseph Bosco, 11 Tompkins Place, Brooklyn, N. Y.
2. Herbert Eldredge.

Class B
1. Bert Weiner, 396 South 4th St., Brooklyn.
2. Emilio DiGioia, 659 East 88th St., Brooklyn.

Rubber Motors

Class A-1
Nathan Asher, 1016-57th St., Brooklyn, N. Y.

Class A-2
Sherman Lee, 4313 Ave. K, Brooklyn, N. Y.
Harry Berkman, 1938 Ocean Parkway, Brooklyn.

Class B-1
Jack McLaughlin, 35 Clark St., Brooklyn, N. Y.
Herbert Nelson, 817-57th St., Brooklyn.

Class B-2
Alexander Rhind, 92 Keap St., Brooklyn.
Sam Kolstein, 213-15 So. 3rd St., Brooklyn.

R. Motors

Class A-1
Sheldon Turk, 216 West 89th St., N. Y. C.
Charles Duchacek, 41-11 48t' t., Brooklyn.

Class B-1
Edward Beshar, 851 West 177th St., N. Y. C.

Class B-2
Edward Beshar, 851 West 177th St., N. Y. C.

Board of Education City Winners

Gliders
(Girls)

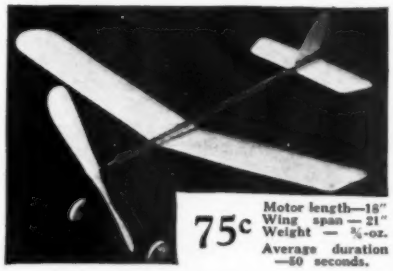
Class A
L. Stanza
V. Valada
H. Kahl

Class B
F. Conti
L. Morello
J. Natale

Gliders
(Boys)

Class A
Y. Pokress, 27 West 86th St., N. Y. C.
J. Bosco

Two New SENSATIONAL MODELS by "GRANT"
Models that YOU will want immediately



75c
Motor length—18"
Wing span — 21"
Weight — ¾-oz.
Average duration —50 seconds.

The Minute Man—M-1

INDOORS or OUTDOORS — A world-beater.

An **ALL-BALSA** machine — light enough to fly indoors, yet so sturdily made that it will withstand a 15-mile-per-hour breeze in the open. The MINUTE MAN has flown over 1000 feet and remained aloft over 60 seconds repeatedly. Kit complete with materials, drawings and instructions.

Easily Constructed
Mailed with extra propeller blank, $1.00 postpaid.

Junior R. O. G. - J-1
FOR THE EXPERT MODEL BUILDER

A featherweight model of GREATER EFFICIENCY than usual in this type. Designed by GRANT, this remarkable machine flies so well because of its perfect aerodynamic design and proportion, thus securing greater duration with less power. The J-1 may be flown with or without the landing gear, which is detachable. Kit complete with materials, drawings and instructions.
Mailed with extra propeller blank, $1.00 postpaid.

75c
Motor length—15"
Wing span — 21"
Weight — 1/4 to 1/3-oz.
Average duration —2 min. or more

OVER 100,000 BOYS fly GRANT MODELS today

Construction Sets
75c; $1.50; $2.50; $4.00*
Assembled Planes
$1.00; $2.50*; $3.00; $3.50*; $6.50*
*Cabin models.

CAMP DUNCAN
Ninth Season
Learn the secrets of the MODEL AIRPLANE. Build and fly them here at the first airplane camp in America. Mr. Grant, designer of all GRANT MODELS will assist YOU personally. Enroll now! A week, a month or a season.
Summer headquarters of the GRANT AIRCRAFT MODEL LEAGUE.

DEALERS
Your line is not complete without these new flying marvels by GRANT
WRITE US TODAY

On mail orders add 25c per plane for immediate shipment
The M-1 and J-1 kits will be shipped together for $1.75 postpaid
GRANT AIRCRAFT COMPANY + + KEENE, N. H.

Junkers "Bremen"
40" Wing Spread

Construction outfit for this beautiful model
SENT POSTPAID $8.50

Graf Zeppelin
Construction Set
Sent Postpaid $7.50

Bellanca
Full size Blue Print with Instructions 75c

We supply Stores, Schools, Clubs and Military Academies SINCE 1909. Our 56 page catalogue contains 26 flying and exhibition models, and a most complete line of parts and supplies for model airplane BUILDERS. All Parts for building Compressed Air Motors.
2 Cylinder Motor with Tank...$ 8.25
4 Cylinder Motor with Tank... 12.50
If your local dealer can't supply you, order direct from us.
CATALOGUE sent postpaid 10 CENTS
U. S. MODEL AIRCRAFT CORP
399 Bridge St. Brooklyn, N. Y.

HELP MEN FLY

TRI-STATE will train you for aeronautical engineering in 108 weeks. B. S. degree at end of the course. Prepare yourself for a well-paying position, get a college education in little more than half the usual time. All unnecessary subjects omitted. Intense concentration on mathematics, mechanics, and laboratory practice. Interesting work in Theory of Flight, Aerodynamics, Airplane Design, Airplane Structure and Airplane Engines. Students fitted for research, testing, design, manufacture, airport management, and saleswork. Basic training valuable in any branch of rapidly growing aeronautical industry.

Work in an atmosphere of self-reliance. Thorough instruction according to individual ability. No entrance examinations. Students who left high school can make up work. Living expenses and tuition low. Graduates hold responsible positions. 46th year. Enter in September, January, March and June. Write for catalog.

TRI-STATE COLLEGE
850 College Street, Angola, Indiana

Hoosier Air Motors and Tanks Won All Air Model Prizes Louisville National Contest October, 1929

Counter balanced steel crankshaft. Unique. Flies 4½ ft. to 6 ft. models. Finished parts, easy to assemble. $2.90 postpaid. Completely assembled and tested $4.90 postpaid.
COMPRESSED AIR TANK—Gnatweight seamless, high pressure, 3" diameter 20" long. $7.00 postp'd. 24" long $8.50 postp'd.
MOTOR AND 24" TANK COMBINATION—Wt. complete only 8¾ oz.! Send this ad. $13.90 postpaid.
COMPLETE KIT FOR 5 FT. COMPRESSED AIR MODEL with blueprint less tank and motor $4.90 postpaid. Have an air model for your next National Model Airplane contest. Order today! Be sure and inclose only money orders or drafts.
R. O. G. RECORD KIT, everything needed with actual size drawing. Only 65c postpaid.
BURNHAM NAT'L CHAMP. KIT 10½ min. tractor. Complete with act. size print $1.00 postpaid.
WORLD RECORD FUSELAGE MODEL—Kit for Lois 16½ min. model complete with large blueprint—only $1.80 postpaid.
RUBBER—1/32" x 1/8" flat full fresh skeins special price till July 1st only—75c postpaid (1/32" x 1/8" same price).
SPECIAL COMBINATION—1 skein rubber—1/8" or 3/32" flat (specify which) & 2 oz. lubricant till July 1st only $1.00 postpaid.
BEST RUBBER LUBRICANT KNOWN used on all latest record models. Doubles winds—Big 2 oz. can, only 35c postpaid.
SEND 10c AT ONCE FOR A NEW ILLUSTRATED LIST JUST OFF THE PRESS showing all the latest and best materials as used by recent National contest winners of trips to Europe, etc., with surprising low prices on the best materials.
Schools; clubs, dealers write for terms. "Model Airplane Experts of Today are the Aviation Experts of Tomorrow."

PERU MODEL AIRPLANE SHOP
DEPT. J, PERU, INDIANA

FREE CABIN GLIDER
SEE T. A. S. AD ON PAGE 63

MODEL AEROPLANE SUPPLIES
Send 5c for bundle of Balsa and Price List on Supplies.
AERO SHOP, 3050 Hurlbut Ave., Detroit, Mich.

NEW WAYS TO WIN MODEL CONTESTS

Broadfield offers Model Builders short cuts in Model Construction and new materials for making finer contest models. Broadfield handles many parts and supplies no others have.

SPECIAL OFFER

Send 25c in stamps, or coin for Handy Razor Knife and a New Broadfield, 44 page Model Aeroplane Catalog, one of the finest and most complete ever printed.

For promptness in answering this advertisement, you will receive a special 25c assortment of Balsa Wood free.

BROADFIELD AEROPLANE CO.
22 Yale Street, Hempstead, New York.

FLYING SQUADRON $2.00

Strong Construction *Great Bargain*

Five (5) Flying Airplanes for $2.00 That Perform Like the Real Thing!
Not construction sets but nearly assembled Planes.
Guaranteed to Fly.
1) **LONE EAGLE BOMBER**—28 inch wood frame paper covered Wing; 7 in. alum. Propeller; 17 in. set Rubber Motors; takes off ground; 300 ft. flights; weight 5½ oz.
2) **LONE EAGLE SCOUT**—20 in. non-breakable Wing; 5½ in. alum. Propeller; Flexible Landing Gear; 12 in. set Rubber Motors; takes off ground; 150 ft. flights; weight 2¾ oz.
3) **LONE EAGLE MOTH**—16 inch Balsa Wood Wing; 4¾ inch metal Propeller; 150 ft. flights; weight ⅝ oz.
4) **GREAT EAGLE GLIDER**—16 inch non-breakable Wing; cabin type Fuselage; Big Value.
5) **LONE EAGLE GLIDER**—12 inch Balsa Wood Wing; cabin type Fuselage; does all stunts.
Each set in individual boxes; all packed in one shipping carton. Complete with interesting Instruction Booklet.

ALL FIVE (5) FOR $2.00
Buy from your local dealers. If not in stock, order direct from us. We pay postage.

Wilder Mfg Co.—Aircraft Model Div.
703 N. Main Street St. Louis, Mo., U. S. A.

Class B
T. Boland
H. DiRocco, 233 Franklin St., Queens, L. I.
E. Beshar, 851 West 177th St., N. Y. C.

Class A-1
S. Turk, Man.; 20 seconds;
216 West 89th St., N. Y. C.
N. Asher, Brooklyn; 16 seconds;
1016—57th St., Brooklyn.

Class A-2
C. Duchacek; 130 seconds;
41-11—48th St., Brooklyn.
S. Lee; 126 seconds;
4314 Ave K, Brooklyn, N. Y.

Class B-1
J. McLaughlin, Bklyn; 132 seconds;
35 Clark St., Brooklyn.
J. Harris, Bronx; 115 seconds.

Class B-2
A. Rhind, Bklyn.; 118 seconds;
92 Keap St., Brooklyn.
E. Beshar, Man.; 58 seconds.
C. Esposito, Bronx; 38 seconds.

Winners of Free for All

Class B-1
A. Boland, 136 seconds.
E. Carpenter; 109 seconds;
Montclair, New Jersey.

Class B-2
E. Carpenter, 229 seconds.
E. Beshar, 155 seconds.

The following is a list of the prizes. $250.00 National Exchange Clubs Cup awarded to the boy winning the Scale Model classes.

American Sky Cadets Gold Medal.

Twelve watches were given to the boys winning first place in Classes B-1 and B-2 of the boroughs.

A number of silver medals and valuable trophies were given out by the management.

There were more than fifteen hundred boys and girls in the contest, and five hundred scale and construction set models on display at the show.

—o—

Model enthusiasts of Greeley County, Colo., are agog with excitement in anticipation of the forthcoming *Greeley Daily Tribune* model air plane building contest on May 31.

Twenty-five prizes, including a complete cabinet radio set, the MODEL AIRPLANE NEWS Gold Medal, and other awards well worth striving for have been donated for the meet.

Mr. F. E. Merrill, editor of the *Daily Tribune*, who has charge of the contest reports that entries have been coming in daily, and that hundreds of model builders, both girls and boys, are expected to participate.

Model airplane building has received great impetus in Greeley County since the *Tribune* has adopted a department of this kind, and there is every indication that Colorado will be able to send its champions to compete in the national meets.

Building and testing of models in preparation for the meet has been going on apace since news of the contest was first made known. Model airplane clubs throughout the county have been carrying out extensive trials with a view to bringing a championship to the club.

One of the outstanding features of the meet is the fact that the rules have been so arranged that a monopoly of prizes is banned. For instance, a student winning the radio set or the fifteen-jewel wrist watch, two very valuable prizes, will not be eligible for any other prize unless he competes in and wins another event. The students next in line will move up.

Junior Mechanics Department

(*Continued from page* 37)

different kinds of wood grows up with a real knowledge of the differences between them. All modern systems of education begin by training the hands of the little children. The whole kindergarten system and the developments of the Montessori school start with giving children of two or three years of age tasks to do with their hands.

There are also sound reasons for believing that the motion picture is a more effective teacher than the school classroom methods of today. Most people have visual perception more highly developed than aural perception. That is, most of us are more readily impressed by seeing things than by hearing them.

Ask yourself the question: "Which do I remember more clearly; the thing that I saw or the thing that I heard?" Nine out of ten will recall the thing they saw long after the memory of the exact words they heard has faded.

There are available today motion pictures illustrating not only every phase of natural history but scientific research and knowledge of every imaginable kind. The greatest teachers in the world have directed the making of many of these films, and now those same teachers are having their lectures recorded on talking films, so that for all time students may see them and hear their voices. A hundred years from now a great teacher like Professor Irving Fisher of Yale, for example, may still be explaining to classes of young folks all over the world the difference between money and wealth, and illustrating his talk with charts and diagrams which he draws on the blackboard before their eyes.

Yale University has sponsored a great number of historical motion pictures, dealing especially with American history, beginning with the voyage of Columbus. Today a few learn history from these films; tomor-

row millions may obtain all their historical instruction in this manner. The United States Government is one of the largest of all film producers.

Government films illustrating every useful agricultural method, showing almost every government activity from the manufacture of money to battle fleets in action, are now available to any Grange, Chamber of Commerce or other local organization which wants to show them, without charge except the cost of transportation. There is hardly an industrial process that has not been filmed; so that it is possible for everybody to see how pins, soap, automobiles, razor blades or anything else are made.

The only obstacle to the universal use of such films and the new ones as they come out is that they are not favored by the managers of motion picture theaters, and so special arrangements have to be made for their projection in any community. However, the school of the future will have not only one room equipped with a motion picture projector but almost as many as there are classrooms. They will not only take the place of some teachers, but will bring into every school the very best teachers, whose salaries most schools could never afford to pay.

Radio is already supplementing the motion picture. Every really progressive school today has one or more radio receiving sets. In many schools special hours are set aside for listening to the radio. The musical courses under the direction of Walter Damrosch, broadcast by the National Broadcasting Company on certain days every week, are doing more toward teaching children what good music is and how to appreciate it than any local music teacher could possibly do.

THE school of tomorrow will be a different institution from the school of today. By "tomorrow" I mean, say fifty years, when modern methods will have been introduced everywhere. Talking pictures and radio will occupy two-thirds of the students' time. There will be books, but they will be supplementary to the visual and oral courses brought in from all the world, books to aid the memory, to explain fundamentals, and not as original sources of information for the most part. Also, there will be training of the sense of touch, not only through the process of "making things" but through some such method as that which the schools of Japan use.

In Japanese schools the children have more than 100,000 different objects which they are required to handle and to take apart. They are made for school use, to teach children what is inside the things they come across in daily life. Thus a school egg, for example, made of some composition, looks like an ordinary egg, but the child can take it apart, remove the shell, lift out the white, and so get down to the yolk in the middle.

The HORNET

A sensational, 16 in. Featherweight Flyer that weighs only ¼ oz.! Has more power for its weight than anything in the air. Balsawood construction; built-up wings with formed ribs; indestructible, detachable landing gear. Easy to make: Construction Set .. 50c

(By Mail, postage 10c extra)

Build *and* Fly these New Ideal Featherweight Models!

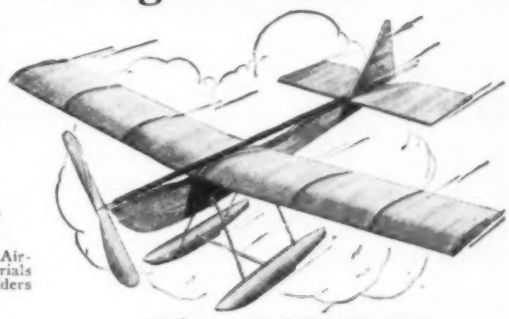
The Latest Development in Light-weight, Long-Flying Airplanes. Simplified, advanced design; all Balsawood construction; adjustable wings; adequate power for long flights; formed fibre propellers; easy, rapid construction . . . the outstanding idea in Model Airplane Design!

Ask your Dealer, or Order Direct by Mail. Satisfaction Guaranteed

Catalogue of Ideal Model Airplanes, Parts, Fittings, Materials and Supplies for Model Builders . . . Mailed for 5c.

IDEAL AEROPLANE & SUPPLY CO., Inc.

20-24 West 19th Street, New York City.



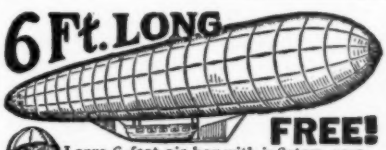
The CONDOR

A Super-plane; 22 in. size and weighs only ¼ oz.! Has built-up wings and formed fibre propeller with improved hanger. Adjustable wings; interchangeable landing gear. Construction is easy; complete

Construction Set $1.00

(By Mail, postage 15c extra)

6 Ft. LONG

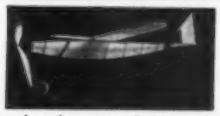


FREE!

Large 6-foot air bag with inflators, parachute and complete instructions for flying. Send name and we'll send 6 of our new reprints of wonderful oil painting pictures to dispose of on special 25c offer. Send $1.50 you collect and for this service we will send this wonderful Airship with instructions free.

C.M. THOMAS, 337 W. Madison St, 5-K-3 CHICAGO

ENDURANCE MODELS



Send 5c for Catalog of models that will win your contests; models built for long duration in the air. This big .39 inch fuselage tractor flies 192 seconds in still air and much more on a hot sunny day. Exceptional stability, less than 2 oz. weight, extra long powerful motor, "slow prop"—a record type throughout. Two sizes—outdoor kit and plan postpaid $2.95. Indoor $1.25. Complete supplies for the model builder at most reasonable prices. Ask for Catalog "M," 5c.

PIONEER MODEL AIRPLANE SUPPLY CO. Champaign, Ill.

FLYING GLORY

Guaranteed to Fly 250 Ft. Price $3.75

Wing Spread 27". Weight 2¼ oz. Has often flown 1,500 ft. Money back if it does not fly 250 ft. Strong, handsome, easy to build. Many new features never before seen. Detachable wings, rudder stabilizer. Patented *Spring* governor motor. Adjustable for speed or endurance. Until you have this model you are behind the times. None other like it. R. O. G. perfect three point landings. Complete kit contains full sized blue prints with all parts cut and ready—fuselage sides and ribs, finished prop with bearings, shaft, etc., attached. Landing gear made. No tools, no boiling. A real bargain at $3.75.

LOWEST PRICES BALSA AND SUPPLIES

Best grade Balsa. Specially cut and prepared for model use.

1" x 6" x 36"	$ .75
2" x 6" x 36"	1.10
2" x 3" x 36"	.80
3" x 3" x 36"	1.10

25 strips of

1/8" x 1/8" x 36"	$ .60
1/4" x 1/4" x 36"	1.25
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1/16" x 6" x 36"	.45
1/16" x 4" x 36"	.32
1/16" x 2" x 36"	.20
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Full supply balsa. Bass Wood any size.
Black celluloid wheels—1-7/8"—35c a pair.
Any color dope 2 oz. can—25c.
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Plan for Flying Glory Monoplane—35c.
Enough balsa, bass wood and reed for making Flying Glory—75c.

Bass wood 1/8 square x 36"—1/16 x 1/8 x 36"—4c a pc.
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1/8 x 1/4 x 36"
1/16 x 1/4 x 36"
1/16 x 3/16 x 36"—5c a pc.
Balsa wood prop blocks any size—1c per inch.
1/16 and 3/32 round wood 12" long—12 pcs. 10c.
1/8 and 3/16 x 36" round wood—4c a pc.
1/8 flat rubber band—50 ft.—45c.
1/8" flat rubber band 1c per ft.
Thinner ¼ oz. can—25c.
Copper washers 1/16 hole—25 in pkg.—10c.
3 ply veneer 20" x 30"—20c.
Aluminum rod 1/16 round and 1/8 round—5c for 10 in.

Aluminum sheets 35 and 40 gauge—25c per sq. ft.
Model screw 3/8 and 1/4 in long—5c pkg.
Model nails—5c pkg.
Ambroid small tube 10" large—15c.
2 oz. can—25c
1/16, 1/8, 3/16 round reed, 6 ft. —5c.
Japanese paper—24 x 20—10c. 35 x 13—12c. 20 x 33—15c.
Music Wire any size—1c per ft
Bamboo 1/16 x 1/4 x 12—12 pcs.—10c.
5c service charge all orders less than $1.00.
5c packing charge on balsa over 18" length.
10c postage east Mississippi. 15c west of Mississippi.
5c insurance if desired.

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FIVE CENTS

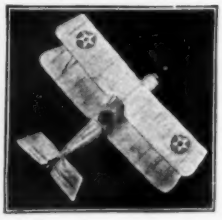
Brings you a complete illustrated booklet containing latest model airplanes, and model airplane supplies. Full description of materials and equipment needed for each model. Every model is designed to fly when made according to our simplified plans of construction. Don't fail to send for it.

The Navy Racer

The Navy Racer is scaled along the lines of the model which recently broke all speed records in England. This is the plane you'll really want to build. What a thrill when you have your Navy Racer assembled—how proud you'll be at your own skill. Made of featherweight Balsa and Bamboo parts. Wing span 22 inches, fuselage 17 inches, altitude over 60 feet, recorded flight over one minute. Get the Navy Racer plane kit set with all material and detailed blueprint ready to build. Send now. Postpaid, $3.50. No stamps.

The S. E. 5 Scout

The S. E. 5 Scout plane is one of the best flying scale models that can be built. Made of featherweight Balsa and Bamboo parts. Wing span 22 inches, fuselage 16 inches. Rises from ground by own power. Recorded flight 45 second. It really is a reproduction of the old Army pursuit plane; you'll get a real thrill when this ship goes "Zooming" away. Get this S. E. 5 Scout plane kit set with all material and detailed blueprint ready to build. Send now. Postpaid, $3.00. No stamps.



Full-Size Layout Blue Prints

Hawk, S. E. 5 Scout, Navy Racer, Ford Tri-Motor, Sea Hawk, Vought Corsair, Waterman Special, each 40c. Baby Commercial, 25c; also outline drawings of Sikorsky, Lockheed Vega, each 25c.

FREE

If you mail your order for any of the items mentioned above, we will send the booklet described above absolutely FREE. Order the Navy Racer or the S. E. 5 Scout plane—real flying models—and get these simplified construction plans and the interesting model plane booklet FREE.—SEND TODAY.—DON'T DELAY.

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BOYS! WANT AN AIRPLANE, FREE?

I'm going to give away some wonderful "guaranteed to fly" airplanes (several models to choose from) to the wide awake boys who will help me out in their neighborhoods with a proposition that is as honest as it is simple and effective.

I have a little surprise for every boy getting started before May 15. Write immediately to

JOHN J. LICAR

2327 S. Cuyler Ave., Berwyn, Ill. No obligation.

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MELVIN MADE MODELS are BUILT TO FLY and GUARANTEED TO FLY!

OR YOUR MONEY REFUNDED

Our

MERCURY-RACER

is the most sensational value in model airplane history! Beautiful straightaway flights of 300 to 800 feet, circular flights, barrel rolls, loop the loops, etc.—All are possible with this wonderful new Distance and Duration model.

KNOCKED DOWN:—Easy to assemble. All parts cut, drilled and bent to shape. $1.00 postpaid.

READY TO FLY:—Beautifully decorated in Vermillion and Oriole Yellow, with Red, White, and Blue insignia on transparent wings. $1.95 postpaid.

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OTHER MODELS:—$1.75—$2.50—$2.75—$3.75. Send 10c. for illustrated catalog of all our models and receive also free samples of wonderful new materials used in construction of our planes. Such as, Japanese Vellum (*stronger than silk*), Genuine F. C. Airplane Rubber (*extremely tough—You try it*), H. C. Steel Propeller shaft, Reed, Fibre, Insignia, etc.—Catalog sent free with your order for MERCURY-RACER.

Send Cash or Money-Order to

MELVIN MFG. CO., 233 Main St., Cincinnati, Ohio

Hints to Model Makers

(*Continued from page 36*)

of steam from a kettle spout and twist to the desired shape. Hold it near the end so as to make the camber. Put the thumb and second finger to the leading and trailing edges of the propeller and squeeze until it has a hollow space in it, and then steam until it holds the curve.

Now find the center and mark it with a pencil. Then with round-nose pliers bend the wire for the prop shaft until it makes a hook small enough to fit the wood. Be careful not to make this hook too large. Slip in place on the center of the propeller and ambroid.

On the side where the washer touches, put a drop of glue. This is to prevent the thrust bearing from pushing the wire off the propeller. In this way, the propeller can be made lighter and with less air-resistance.

The whole operation does not require more than twenty minutes.

Macfadden Aviation Advisory Board

(*Continued from page 35*)

The Bowlus sail plane is a high wing, cantilever monoplane with tapered wings. The wings are constructed in three parts; the 6 ft. center section being built as an integral part of the fuselage and the two 19 ft. wings are bolted to this center section.

The wing span is 44 ft., the chord at the root is 5 ft. 6 in. and the wings taper to 2 ft. 8 in. at the tips. The overall length of the fuselage is 25 ft. The weight of the sail plane empty is 160 lbs., but with landing gear 180 lbs.

The U. S. A. 35-A wing curve is used. This U. S. A. 35-A airfoil has been chosen because of its high lift and suitability to cantilever construction.

The ailerons are 10 ft. long.

Normally, the Bowlus sailplane will take off at 22 miles an hour and with its gross weight of 305 lbs., has a glide ratio estimated at 20:1.

—o—

On a question of law as affecting aviation, it is pointed out that the New York University School of Law has adopted as part of its curriculum a series of lectures on this subject, and all and any future airmen are strongly advised to study this aspect of the industry and thus create for themselves a standing far and above what might be termed "just another pilot."

Aviation's fast growing publications field welcomes to its midst *The Air Law Review*, edited by Prof. Allison Reppy. This publication is a pioneer in its field and contains articles on the legal aspect of both aviation and radio.

—o—

Now, to continue with the list of planes of the Allied and Central War Powers:

German—(Continued)

L. T. G. fighting aeroplane, 175 h.p. engine

L. V. G. two-seater biplane, type C. V., 230 h.p. Benz engine

L. V. G. biplane, Type C VI, 230 h.p. Benz engine

L. V. G. Scout, single-seater, D.V. type

Mercedes - Daimler single - seater "Wireless" parasol monoplane, type L II

Mercedes-Daimler "C" type, two-seater fighter No. 8

Mercedes-Daimler single-seater biplane No. 9

Pfalz fighter monoplane, equipped with two machine guns for firing through propeller, G. 141, 160 h.p. Mercedes engine

Pfalz Chaser DIII, single-seater

Pfalz DXII, single-seater fighter, 180 h.p. Mercedes engine

Pfalz biplane

Rex fighting biplane, single-seater fighter, Rex engine (Gnome type) with machine gun

Rumpler two-seater biplane, type C.V., 260 h.p. Mercedes engine

Four-engined Zeppelin "Giant" biplane for bombing, four 300 h.p. Maybach engines

Zeppelin "C" Class, two seater biplane

Zeppelin "D" Class, all-metal, wireless scout

Zeppelin, five-engined Giant bomber, five 250 h.p. Maybach engines

Zeppelin Giant biplane seaplane, four 250 h.p. Maybach engines

Dutch

Spyker, two-seater scout, V.4 for reconnaissance, 130 h.p. rotary Spyker engine

Spyker, single-seater fighter, V.3 for air fighting, 130 h.p. rotary Spyker engine

Spyker school biplane, dual control, V.2, for training, 80 h.p. rotary Spyker engine

Italian

Caproni triplane, five-seater bomber, three 400 h.p. Liberty engines

Caproni three-engined triplane, type C. A. 4, for bombing, three 400 h.p. Liberty engines

Gabardini biplane, single-seater tractor for advanced training, 80 h.p. LeRhone engine

Gabardini biplane, single-seater tractor for advanced training, 110 h.p. LeRhone engines

Dear Sirs:

Would you please tell me if you have to go to high school to be an aviator?

Yours truly,
WILLIAM HOFFRAGE,
135 Addison Ave.,
Elmhurst, Ill.

Answer:

A good common school education is all that is required in order to study aviation. However, it is a distinct advantage to have a high school and even a college education in order to become an aviator of standing. The Army Air Corps requires at least two years of college education from a prospective Cadet, but if you wish to enter a flying school and get your training in this way, you do not, of course, have to have more than a grammar school training.

Gentlemen:

I would appreciate it if you will tell me just what restrictions and privileges are granted to the various classifications of pilots.

Yours truly,
ROBERT MUENSTER,
2510 Cass St.,
La Crosse, Wis.

Answer:

Transport pilots may pilot any type of licensed aircraft, but not unlicensed aircraft carrying persons or property for hire. Transport pilots have all of the privileges of navigating aircraft conferred upon other classes of pilots, which include the right to instruct students in the operation of aircraft in flight.

Limited commercial pilots have all of the privileges and are subject to all of the restrictions imposed upon transport pilots, except that they cannot pilot aircraft carrying persons for hire outside of the areas mentioned in their licenses, nor can they, for hire, instruct students in the operation of aircraft in flight.

Industrial pilots may pilot any type of licensed aircraft not carrying persons for hire but cannot pilot unlicensed aircraft carrying either persons or property for hire and cannot, for hire, instruct students in the operation of aircraft in flight.

Private pilots, not designated as students, may pilot licensed aircraft but cannot carry persons or property for hire in licensed or unlicensed aircraft. Private pilots designated as students are licensed only for the purpose of piloting licensed aircraft when receiving flying instructions and such student pilots cannot pilot licensed aircraft carrying persons or property for hire or for any other purpose than receiving flying instructions nor within any other area than that specified in their licenses. Private pilots cannot, for hire, instruct students in the operation of aircraft in flight.

Dear Sirs:

I built a Curtiss Hawk pursuit plane but when I try to make it

Half a Million People
have learned music this easy way

You Too, Can Learn to Play Your Favorite Instrument Without a Teacher

Easy as A-B-C

MANY of this half million didn't know one note from another—yet in half the usual time they learned to play their favorite instrument. Best of all they found learning music *amazingly easy*. No monotonous hours of exercises—no tedious scales—no expensive teachers. This simplified method, perfected by the U. S. School of Music, made learning music as easy as A-B-C!

From the very start you are playing *real* tunes perfectly, by *note*. Every step, from beginning to end, is right before your eyes in print and picture. First you are *told* how to do a thing then a picture *shows* you how, then you do it yourself and *hear* it. And almost before you know it, you are playing your favorite pieces—jazz, ballads, classics. No private teacher could make it clearer. The cost is surprisingly low—averaging only a few cents a day—and the price is the same for whatever instrument you choose.

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Mandolin	Saxophone
Piano	'Cello
Organ	Ukulele
Violin	Cornet
Banjo	Trombone

Or Any Other Instrument

Learn now to play your favorite instrument and surprise all your friends. Change from a wallflower to the center of attraction. Musicians are invited everywhere. Enjoy the popularity you have been missing. Start now!

FREE BOOKLET AND DEMONSTRATION LESSON

If you really *do* want to play your favorite instrument, fill out and mail the coupon asking for our Free Booklet and Free Demonstration Lesson. These explain our wonderful method fully and show you how easily and quickly you can learn to play at little expense. Instruments are supplied when needed—cash or credit. U. S. School of Music, 4675 Brunswick Bldg., New York City.

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Send me your amazing free book, "Music Lessons in Your Own Home," with introduction by Dr. Frank Crane; also Free Demonstration Lesson. This does not put me under any obligation.

Name .....
Address .....
Instrument ..... Have you this Inst? .....

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FREE CATALOG

Design Shown silver plate 35 cents each, $3.50 doz. Gold plate or sterling silver 50 cents each, $5.00 doz. Made with any 6 letters or less; 2 colors enamel.

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By Bernarr Macfadden

You will find this book the most useful and the most helpful of any in your library—valuable beyond words because of the information and facts it contains. It is indeed a great household guide to health. A handbook which tells you what and how to do in fighting disease and ill health. And the vital, essential health information is not for you alone, but for every member of your family as well.

Price postpaid $2.00

MACFADDEN BOOK COMPANY, INC.
Dept. MN5, 1926, Broadway, New York City

BABY-BUG??
SEE T. A. S. AD ON PAGE 63

"AIRCRAFTERS"
Summer Aviation Camp for Boys and Young Men
On Connecticut River in Vermont

Building and racing of model planes and boats. Work on actual planes and flight instruction for older boys. Speed boat building and racing. Cups and prizes. All sports. A vacation you will never forget! Write for Catalog.

WARRINGTON C. WADEMAN, Director
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BOYS: WIN THIS BIKE

This bicycle is one of many prizes you can win. Start at once by sending your name on the coupon.

This swift and sturdy bicycle can be yours. We need a boy in your neighborhood to deliver the American Magazine, Woman's Home Companion and Collier's, The National Weekly, to regular customers. Hundreds of boys are getting bicycles like this one, and also cash commissions and other big prizes. You can easily do it, too.

BOYS—MAIL THIS COUPON AT ONCE

Mr. Jim Thayer, Dept. 146
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Dear Jim: I want to earn money and win prizes. Please start me off as a salesman.

My Name .....
Address .....
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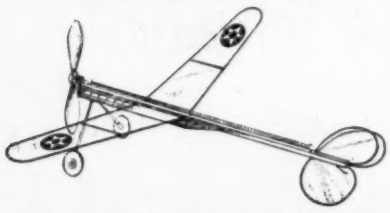
It will R. O. G. (rise off the ground) under its own power and fly to 500 to

3000 FEET

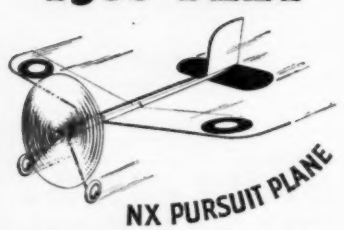


and after a long glide it will make a perfect 3-point landing. Its name is the METEOR and it is the finest flying model made. The all flexible construction with a light, puncture proof covering enables this plane to make hundreds of thrilling flights. The propeller is of the fixed pitch type that will not warp nor vibrate. It turns on S. K. F. bearings and is driven by an extra long F. C. airplane rubber. The rudder is adjustable, permitting any direction of flight.

KNOCKED DOWN—easy to assemble, everything cut, drilled and bent to shape—all materials furnished including ambroid, labels, insignia, etc. $2.50 postpaid and insured.

FULLY ASSEMBLED—READY TO FLY—Beautifully decorated in Vermilion and Oriole Yellow on transparent wings. $3.75 postpaid and insured

1500 FEET



—an all balsa model that performs like a "CURTISS HAWK". It will rise off the ground under its own power and climb to an altitude of over 200 feet. After the power is used up it will glide slowly down to a perfect 3-point landing having covered over 1,000 feet. (With wheels removed it will fly 1,500 feet.) Can be made to loop and return. Finished in red and blue; weighs 1 oz.; length 19 inches; propeller 8 in.; lubricated rubber that won't break under *350* turns. **$1.00 postpaid.**

KAHN AIRCRAFT COMPANY
5710 Woodlawn Avenue, Chicago, Ill.

Real Gas Engine Flies Model Airplanes

Here is a wonderful example of engineering ingenuity. A real gasoline engine that weighs only three pounds, yet develops ½ h.p. It is a 2 cycle, 3 port air cooled aluminum alloy engine with 1½" bore and 1½" stroke. It is 6" high and 2¼" in outside diameter. This engine is perfected and is not an experiment.

9 Ft. Model Plane Flies One Mile

And climbs 200 feet when equipped with this motor. It has many uses such as running an ordinary canoe, small row boat and light motorcycles.
It is just what model plane builders have been looking for. It is an engine that will make their models fly.

Send at once for complete information and Bulletin No. 48 which describes this motor.

DYNAMIC MFG. CO.
Dept. 106
Monadnock Building Chicago, Illinois

fly, the front of the plane goes up and it turns over on its back. Could you please advise me what to do?

Yours truly,
WILLIAM JENCIK,
265 Wilson Ave.,
Hudson Heights, N. J.

Answer:

We would suggest that you try putting the wings a little bit further back which, of course, will give additional weight to the nose and overcome the model's tendency to climb on to its back.

Dear Sirs:

Would you please tell me what the numbers mean on any aeroplane, as C522X equals a private owned plane. It doesn't really, but to use it as an example to enable you to understand what I am writing about.

Sincerely,
HOWARD RISLEY,
244 Park Ave.,
Oneida, N. Y.

Answer:

After inspection, the government licenses planes under various classifications and denies license to a plane which does not measure up to requirements.

The "identified plane" is one that has been given a number but which has not been passed or certified. Hence, it carries the letter "N" before its number and, in addition, is compelled to display a metal plate with the information that it is not passed by the government.

The next class of license is the "temporary license" or letter of authority given while the machine is awaiting inspection or the judgment of the inspectors. Such a plane, while not certified, is not condemned. It bears the same type of number as the one described above but does not have to display the metal plate required of that class.

Then there is the "experimental plane". On this the official letter "X", which appears on every kind of authorized plane, is followed by the letter "X" to indicate that the plane embodies some experimental construction not yet definitely approved by the government.

The highest endorsement placed on a plane is to brand it with the letter "C" following the official "X". "XC" is the mark of the fully certified plane, and only those that have been thoroughly listed and inspected are privileged to display this combination. It indicates that the plane has met all demands of the government designers, engineers and inspectors and the assurance that the plane is periodically examined under government supervision.

A plane marked with the letter "R" following the "X" carries a "restricted license", which entitles it to be used in airports and within certain other strictly defined limits.

Dear Sirs:

What is the so-called rotary motor? How does it work and is

A REAL FLYER "PARLOR FLY"
Surprise Your Friends

SEND 50c (no stamps): by return mail you will receive your "PARLOR FLY", assemble it, this only takes a short time, gather in your boy friends, the dads and mothers and give them a real THRILL right in your living room.

The "PARLOR FLY" is the first model that has succeeded in flying in the average size room. It is small but powerful and is easily assembled. All parts come ready to assemble including a ready made propeller. Send two cent stamp for price list which contains all supplies that the Model Airplane Maker Needs.

MODEL AIRPLANE SHOP
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Select from 44 Styles, colors and sizes of Mead Bicycles. Ride and exhibit sample RANGER and make money.

Factory to Rider: We ship on approval for 30 Days' Free Trial, direct from FACTORY. Get our marvelous offers. Easy Payments. $5 down.

Tires lamps, horns, wheels, parts, equipment, and repairs at half usual prices. Established 38 years.

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NEW TYPE BABY R.O.G.

A Speedy Model, Complete Kit	$ .50
20" Wing-span Cabin Model Kit	1.25
1/8" x 30 Rubber, 35 ft. 25c; 200 ft.	1.25
3/64" Sq. Rubber, 40 ft. 25c; 200 ft.	1.00
Japanese Imperial Tissue, 6 sheets	.25

Above articles postpaid. Stamp for list.

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Better Moulds Than Has Been, moulds as low as $1.50 each. To Cast Lead Soldiers, Indians, Hunters, Wild and Farm Animals. **214** Wonderful "True To Life Models." Easy and inexpensive to make. I furnish all necessary material including Enamel. Send 4c Stamp for Illustrated Catalogue.

D. SCHIERCKE. 1034-72nd Street. BROOKLYN. N. Y.

Hint to Modelmakers

On that next plane use Unitite Cement. It dries very quickly, is transparent, and possesses strength to a high degree. Keep a can of it handy in your workshop. Send 25c in coin for a 2-oz. can to Unitite Liquid Cement Co., 3315 Agnes Ave., Kansas City, Mo., together with your model supply dealer's name.

All Sky Cadets Need This Aircraft Manual!

So many requests have been made for an aircraft manual for American Sky Cadets that it has been decided to adopt **Practical Aviation** ***as the official aviation guide of the Sky Cadets.***

Practical Aviation ***contains the story of this ever-growing industry from A to Z and contains the proverbial thousand and one illustrations.***

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1926 Broadway, New York

it as efficient as the regular type of motor?

Yours truly,
BEN BRANCH,
730 So. Court St.,
Montgomery, Ala.

Answer:

A rotary motor is one in which the cylinders revolve with, and in the same direction as the crankshaft, whereas a stationary motor has the cylinders motionless as the propeller turns.

Rotary engines are now practically obsolete because the rotative speed was limited to about 1,200 revolutions per minute, and also because the cylinders absorbed considerable power in turning to overcome air resistance.

It is stated that seven horsepower was used in turning the cylinders of the Gnome rotary engine developing but fifty horsepower. Another disadvantage was that such engines made airplane control difficult during certain maneuvers because of gyroscope effects due to the rotating mass. Hence you can judge that the stationary motor is superior to the rotary type.

Dear Sirs:

Will you please answer the following questions?

How are the pistons connected to the crankshaft in a radial engine? Which gives more power; a radial engine or a Liberty type engine? Why is there fin-like construction around the cylinder heads?

Very truly yours,
E. A. SCHEFFLER,
1058—80th St.,
Brooklyn, N. Y.

Answer:

The pistons are connected to the crankshaft of a radial engine in various ways, depending on the manufacture of the motor. For instance, following is a description of the Fairchild-Caminez engine. This is a four-cylinder radial, employing a cam drive mechanism in which the reciprocating motion of the pistons is converted into the rotary motion of the propeller shaft by means of rollers in the piston operation on a double-lobed cam on the main shaft. With the four-stroke cycle that is used, each piston completes a power stroke every revolution of the shaft. By this means a high-power output is obtained per cubic inch of piston displacement at a low airscrew speed, the shaft speed on the Fairchild-Caminez engine being one-half that of a normal crank engine of equal piston displacement for the same power output. Similarly, the motion of the pistons in opposite cylinders is identical with respect to the engine axis, so that the piston inertia forces balance each other, ensuring perfect running balance without the use of counterweights.

Your question as to which gives more power, a radial engine or a Liberty type engine, is open to argument. It depends on the size of each.

The fin-like construction around the cylinder heads is to create a greater and swifter cooling.

Gentlemen:

Will you please tell me if it is possible to build a model of a Curtiss Hawk combat plane with an electric motor, such as Erector sets have, powered by one dry cell. If so, what would be the best kind of material to use?

Yours,
JAMES H. GALE,
19 Washburn Ave.,
N. Cambridge, Mass.

Answer:

We hardly think it possible to build a model of a Curtiss Hawk to carry an electric motor, unless the model is somewhere in the neighborhood of six to nine feet. The weight of the motor would have a great deal of bearing on the flying qualities of such a model but it is possible, however, that such a model could be built with a compressed air motor.

Dear Sirs:

I am a beginner in aviation and I would like to know how to measure the fuselage, accord-

This Is for You—So Answer the Questions, Please

Many of our readers have written in from time to time expressing their opinions concerning the magazine. Some say they want only plans and stories about heroes of the air, etc. Others say they want only pictures of planes and no stories, and so forth.

What do you want? Put "Yes" or "No" against the questions listed below. We want to give you what you want, but we can't do so if you do not tell us.

Do you like:

The model airplane plans .....?

The stories .....?

The pictures .....?

The Aviation Advisory Board .....?

The Junior Mechanics section .....?

Please don't fail to answer these questions. Cut out the coupon and mail it to The Editor. This is your magazine, so help to make it even bigger and better.

Bike Riders

Join this National Safety League

The Bicycle Riders Thrift League of last year has become the Bicycle Riders Safety League. Its purpose is to promote safety in bicycling. Its members pledge themselves to think safety, act safely, and work for safety in whatever ways they can.

Mail the coupon for your membership in the Bicycle Riders Safety League, Safety Code, and catalog now. Doesn't cost a cent to join—no dues.

One of the first rules of safety is to keep your bike in good condition. Neverleak Tire Fluid helps you do that.

No need for rubber bands, plugs or patches

Neverleak does a better job. It makes single-tube tires leak-proof. Ends puncture troubles. Before you use your bike in the spring or when you get a new tire, squeeze in Neverleak. Neverleak seals punctures up on the run.

So get a tube for each tire from your bicycle, sporting goods, or hardware dealer today.

If your dealer can't supply you order direct, enclosing 25c for each tube. **Liquid Veneer Corporation, Buffalo, N. Y.**

Bicycle Riders Safety League
821 Liquid Veneer Bldg., Buffalo, N. Y.
Send membership badge, safety code, and Safety League Catalog.

Name.....
Address.....
City..... State.....

The Original and Only

NEVERLEAK
TIRE FLUID

Simplex Air Model Co.

AUBURN, MASS.

Send 5 cents for complete parts list. A 5 cent service charge is required on all orders amounting to less than $1. A 5 cent packing charge is required on all shipments of wood or metal greater than 18" in length. Prices are subject to change without notice. All goods sent postpaid in the U. S. A. No stamps or C. O. D. orders accepted.

1/16" x 1/2" x 3'	Spruce	0.3c.	Balsa 06c.
1/16" x 1" x 3'	"	.03	" .033
1/8" x 1/2" x 3'	"	.045	" .054
1/4" x 1/2" x 3'	"	.054	" .06
1/2" x 1" x 3'			" .24
1" x 3" x 3'			" .48
1" x 3" x 3 1/2"			" .56

Reed 6' lengths, 1/16" diam. .05c.; 1/8"—.075c.; 3/16" .10c

Balsa discs 1/4" thick 2" diam. .07c.; 3"—.08c.; 4" .09c.

Ambroid dope 1/4 pint .50c — 1/2 pint .95c

Ambroid Cement 2 oz. .33c. — 4 oz. .53c.

Bamboo paper 13" x 36" .12c — 24 3/4" x 33 3/4" .14c.

Rice paper 18" x 24" .09c. — 21" x 25" .06c.

Wood veneer — 20" x 30" .22c.

Flat rubber 50' of 1/8" .50c — 50' of 3/16" .75c.

Piano wire 3' of No. 5 or No. 8 .04c. — 3' of No. 11 or 15 .06c.

28-30-32-34-steel wire per spool .10c.

1/16" copper washers 10 for .05c.

We can supply any size balsa that you need, also propellers, I beams, wing sections, bolts, nuts, screws, brads, aluminum, brass tubing, turnbuckles and books on model building.

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Send us your name and address for full information regarding the Aviation and Airplane business. Find out about the many great opportunities now open and how we prepare you at home, during spare time, to qualify. Our new book "Opportunities in the Airplane Industry" also sent free if you answer at once.

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GUN PLANE

Wonderful Stunt Plane

Shoots from catapult like the big planes launched from ships. Stabilizer for looping and other stunts. Airplane wings are light basla wood, 14¼ inch spread, lenght of plane 17 inches. This Flying Fool Airplane holds 800-foot flight record.

When ordering enclose 10c postage.

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FULTON TOY PRODUCTS CO.

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Hello World

We are not a chain store but how is this for a bargain.

10 Ft. No. 6 and 10 Ft. No. 9 rust proof Music Wire, 50 Ft. 1/8" flat pure Para Rubber, 2 dozen hard brass Washers with .028" hole, 2 sheets 21" x 31" Japanese Mino Silk Tissue, 2 - 2" aluminum rubber-tired Wheels.

All of the above postpaid in U. S. A. for $1.00. Send stamped envelope bearing your correct address for free price list of other bargains.

Country Club Aero Supply Co.

5821 Holmes St., Kansas City, Mo.

"Where your dollar has more cents."

ing to the wing spread.

Respectfully yours,

. HERMAN BROD,

1/6 Ft. Washington Ave.,

New York, N. Y.

Answer:

It is usually found that the fuselage is two-thirds the length of the wing span and the tail empennage one-third of the wing span.

We think that if you adhere to these measurements, you will have no trouble in making your model fly.

How to Build a Vought Corsair

(*Continued from page 8*)

Material List

1 piece	1/16" x 2-1/2" x 18"	balsa	formers
1 piece	1/16" x 1-3/4" x 18"	balsa	wing, stabilizer, rudder ribs
1 piece	1/32" x 1-3/4" x 18"	balsa	fuselage stringers
5 pieces	1/16" x 1/16" x 24"	balsa	leading and trailing edges
1 piece	1/2" x 1/2" x 3-1/2"	balsa	headrest streamline
2 pieces	1/8" x 1/4" x 13-1/2"	balsa	struts and landing gear
1 piece	1/8" x 3/4" x 3-1/2"	balsa	landing gear cross brace "A"
1 piece	3/8" x 1-3/4" x 1-3/4"	balsa	nose block
1 piece	3/16" x 1/4" x 13-1/2"	balsa	motor stick
1 piece	9/16" x 1-3/16" x 8"	balsa	propeller
1 piece	2-1/2" x 3"	wood veneer	cockpit former
4 pieces	1/8" x 24"	round wood	wing spars
1 piece	1/8" x 8-1/2"	round wood	stabilizer spar
6 pieces	1/16" x 1/4" x 15"	bamboo	stringers wing tips, etc.
2 feet		No. 14 music wire	clips and fittings
2 sheets	20-1/4" x 24-1/4"	Japanese tissue	covering
1 pair		2" celluloid wheels	landing gear
6		1/4" copper washers	bearing and wheel stops
1 bottle		ambroid	gluing
1 bottle		banana oil	doping and fastening tissue to frame
1 piece	2" x 3"	celluloid	windshield
1 bottle		orange dope	coloring wings and stabilizer
1 bottle		silver dope	fuselage coloring
1 small bottle		red, white and blue dope	rudder and wing cockades

bent and forced back into the propeller hub and ambroid is applied to prevent the shaft from becoming loose.

An "S" hook is made from number 14 music wire and should be used at the rear end of the rubber motor. This hook is optional and is used only in cases where a winder is to be used for winding purposes. The rubber motor consists of ten strands of 1/8" flat rubber which is hooked between the propeller hook and the rear motor hook.

The coloring of the navy Vought Corsair is silver, except for the top surface of the upper wing, which is orange. This color scheme was chosen so that it would be difficult to distinguish the plane from the ground and yet the pilot of another plane could see the Vought Corsair from above and thereby prevent an accident in the air. The rudder has three vertical strips of red, white and blue; the blue at the rudder hinge, the white in the center and the red on the outside. The star and circle cockade of the armed naval force of the United States is painted on the top ends of the upper wing only. In painting this design the star should be white, while the center circle is red and the outer circle navy blue.

The lettering "U. S. Navy" is on the top of the upper wing and also on the bottom of the lower wing, reading from left to right in both instances. This makes it possible to read from the ground with the plane coming toward one and also possible to read from the air with the plane just ahead and below. The lettering "U. S. Navy" is also put on the side of the fuselage from the rear cockpit back toward the end of fuselage. The plane's serial number is printed on both sides of the vertical fin. All this lettering is in navy blue.

The navy also requires that there be printed on the left side of naval planes just forward of the pilot's cockpit the name of the warship to which the plane has been assigned. This also is printed in navy blue.

Let's go, boys. Wind her up and let's all have a model dog fight with our newly finished Vought Corsair, the naval terror of the skies.

Model Airplane News—Plans and Parts

Those who wish to purchase parts for the construction of models, or blueprints, will be furnished with the name and address of the company which stocks them, upon request for this information from the reader. Address the Editor, MODEL AIRPLANE NEWS, Macfadden Publications, Inc., 1926 Broadway, New York City.

TRANSCONTINENTAL AERO SUPPLY
A NATIONAL CHAIN OF INDEPENDENT DEALERS

BABY BUG

A SENSATIONAL NEW PLANE

It takes off, banks, turns and always makes "three" point landings. This plane has a new prop, making it the smoothest and speediest flying plane built. Takes off like a pursuit ship. And only costs 50c (no stamps). We pay postage. With each plan we will give a

FREE CABIN GLIDER

It's called *Wings! It* is a regular cabin job with a flaming Indian red fuselage and lemon yellow wings. It loops, dips, banks, turns and returns to the flyer. We know you will want these two dandy planes for only 50c (no stamps), or we will send 6 planes for $1.25.

RECORD MODELS

A real cabin endurance plane. Has record of 92 seconds. 20" wing spread, will R. O. G. bank, turn. Complete kit only $1.00. Send your order today to any of the T. A. S. dealers below

Main Store, Transcontinental Aero Supply, 4550 Nat'l Bridge, St. Louis, Mo.

T. C. Knighten, 808 N. Bishop Ave., Dallas, Tex
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Introductory Offer $1.00

This beautiful pursuit plane, if constructed properly to the full size plans, will fly from 100 to 150 ft. In this kit you get complete material, including solid balsa wing, only $1.00. (No stamps or C. O. D. order accepted.)

HIGHLAND AERO SHOP
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Genuine U.S. ARMY Airplane Generator Propeller

Brand new. Total length, 15 inches. Fine for clock mounting or decorative purposes **$2.00 Postpaid**

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NEW SCIENTIFIC WONDER
"X-RAY" CURIO

10c 3 for 25c BIG FUN

BOYS You apparently see thru Clothes, Wood, Stone, any object. See Bones in Flesh. FREE Pkg. radio picture films, takes pictures without camera. *"You'll like 'em."* 1 pkg. with each 25c order.
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AMERICAN SKY CADETS ATTENTION

DON'T FORGET—You get 10% discount on all orders from our store. Send your membership card with first order. We will register it at our store and return same with order. Thereafter send your serial number only, when ordering.

Our NEW CATALOGUE will be sent for 10c in coin. Money refunded with first order.

South Haven Model Airplane Supply Co.
P. O. B. 63, South Haven, Mich.

Home Labor Saving Devices

(*Continued from page* 38)

rod. Set the four uprights in place, and insert your shelves, starting at the top. The shelves themselves will hold your uprights firmly in place, especially if you put a washer on the outer end of the supporting rods to prevent slipping.

To Make a "Hideaway"

Every workshop has in it some valuable small tools, and sometimes expensive or poisonous chemicals, which are often used, but which the careful craftsman does not like to leave where the wrong person may pick them up. A hiding place which is as convenient as it is safe may easily be made by simply sawing off four inches of the rear of one of the drawers of your table or desk, shortening the drawer this much. In the space left, hang a four-inch shelf. Articles placed here will be out of sight, for meddlers will never think of removing the entire drawer. However, the initiated has his property within reach.

Modernize the Easy Chair

Two pieces of half-inch board, a pair of light steel hinges, a bolt, nut and washer are the only materials necessary to make this convenient folding shelf for the chair arm. The smaller board is cut to the width of the arm, and bolted to it about six inches from the end. Set it a little off center toward the hinge side. The hinges should be set well into the wood. The larger board hangs by its hinges when not in use, and is raised and turned at right angles, thus giving it a firm base, when a table for holding writing materials, dishes, or glasses is desired.

Plagiarism

Stories have been submitted to* MODEL AIRPLANE NEWS *which are copies of stories that have appeared in other magazines.

Anyone submitting a plagiarized story through the mail and receiving and accepting remuneration therefor, is guilty of a Federal offense in using the mails to defraud.

The publishers of* MODEL AIRPLANE NEWS *are anxious—as are all reputable publishers—to stamp out this form of theft and piracy and are advising all magazines from which such stories have been copied of such plagiarism, and are offering to cooperate with the publishers thereof to punish the guilty persons.

Notice is hereby given to all who have submitted or who submit stories that the same must be ORIGINAL.

FLY THIS COMBAT MONOPLANE!

This realistic copy of a military monoplane is an unusually graceful flyer. Wing-spread 18 in. Weight only 7-8 oz. Will take off by own power and fly over 80 ft. Markings in red and blue. Can be built in 2 hours without tools. Construction set includes 6-in. aluminium propeller with shaft, 1¼ in. disc wheels, wood struts, rubber band motor and all other parts, with clear directions. Complete set, packed in unbreakable container, only $1.00, postpaid in U. S. and Canada. Order today. Satisfaction or money refunded.

The MIDLAND MODEL WORKS
Chillicothe, Ohio

(We cannot make C.O.D. shipments. No retail catalogue issued.)

Boys fly the Mat Metal Monoplane

Constructed of aluminum wire securely soldered, 13" long with 12" silk covered wing and tail surfaces. Hand carved propeller and heavy rubber for power. Not a construction set. Satisfaction guaranteed.
Price ready to fly $1 postpaid.
Mat Schleck, 1308 Eberhardt Court, Madison, Wis.

How Far ? Will the Hamilton Fly

Wing Span 24"
Length 20"

1000 FOOT FLIGHTS EASY WITH THE HAMILTON! The biggest advance ever made in model construction. Wings and rudder of Featherflex, a three ply wood, each ply 1/100" thick. Ten times stronger than balsa. This plane is **crashproof** and has made many flights of more than 1000 feet. This great plane has a special bentwood propeller, drilled ribs, the best of Jap tissue covering and all parts are complete ready for assembly. The kit includes a 2-ounce can of dope, tube of Ambroid and all necessary parts for building. The only tools required are a safety razor blade and a small camel's hair brush. **Sent postpaid for $2.00.** Mail coupon below.

FREE $10 PARTS KIT!

We give free for each of the 12 longest flights a $10.00 parts kit containing all necessary parts for building a complete planes. This kit is complete and will not cost you a penny if your plane is one of the 12 prize winners. Details when you mail coupon.

Tear Here

Ace Arrow Model Aeroplane Corp.,
26 W. 17 Street, New York City.

I am enclosing $2.00 (Money order or check, no stamps). Please send me, postage paid, the Hamilton Tractor Kit described above.

Name.....

Address.....

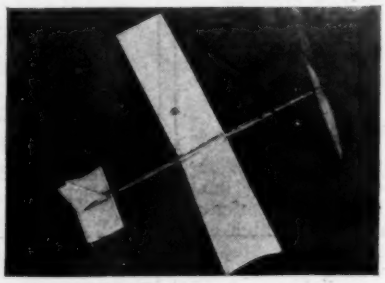
Town..... State.....

☐ (*Note: if you wish copy of latest prices on full line of parts, please mark X in box on left.*)

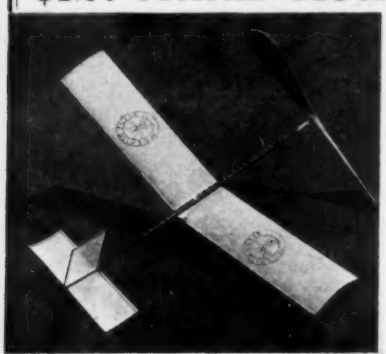
MOSKITO FLIER NEW MODELS

50c POSTPAID BABY R.O.G.

The sensation of the New York Aviation Show. This is the Official Kit of the American Sky Cadets. To the right an actual unretouched photo of the Baby R.O.G. which made duration flight of 4 mins. in the air before thousands of people. This is a sure contest winner. You must have one for your hangar of models. Cannot be beaten at twice the price. Get it today.



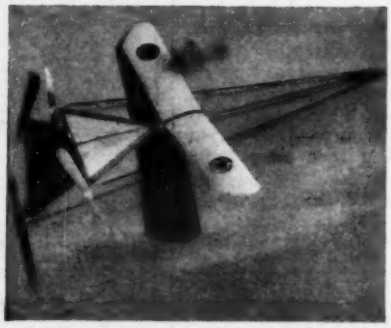
$1.00 POSTPAID MOSKITO FLIER



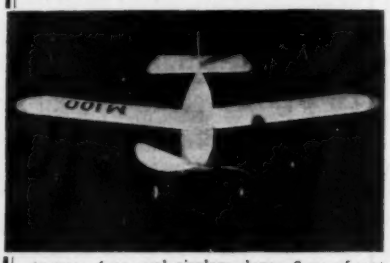
The big brother of the famous Baby R.O.G. Special slow revolving propeller keeps it in air 5 minutes or more.
Kit absolutely complete with full sized layout and all details. Free extra propeller. Wire fittings all bent and ready to use. Aero dope and aero cement. Balsa construction throughout. Can be adjusted for height or distance. Be the first in your neighborhood to get this sensational Flier. Rudder adjustable. Can be flown in small room. You'll never be satisfied till you own a Moskito Flier—Why wait?

$3.00 POSTPAID TWIN PUSHER

Absolutely the slowest flying model obtainable. Flies 10 minutes and many hundred feet. All balsa construction. Wing spread 30". Weight 2¾ oz.—can be lightened. You can be as sure the Moskito Twin Pusher will outfly any other model as you are that there will be a flame when you strike a match.
Most complete kit on market. 2 blank balsa propellers—right and left—sent extra with kit. Free winder, dope, cement. Wire fitting all formed. Wing ribs cut to fit and wing curve proven. You'll get a $100 worth of fun out of this $3.00 model. Easy and simple to construct with full size layout sheet. If you want fun, this is your model.



$3.50 POSTPAID CABIN TRANSPORT



This model has flown 1,200 ft. Wing spread, 36". Fuselage, 20". Weight, 3 oz. or less. All balsa wood construction. Flying speed only 7 miles per hour. Fuselage sides already made and all wood cut to size. You'll find it easy and thrilling to build this model. 12" carved propeller. Extra blank free with carving instruction sheet. New type landing gear, shock absorbing and unbreakable. All fittings made and ready to use. 4 oz. real airplane dope. 2 oz. of waterproof cement which dries white. Ribs cut and shaped ready to use, with wing curve tried and proven. An unbeatable bargain at $3.50 postpaid.

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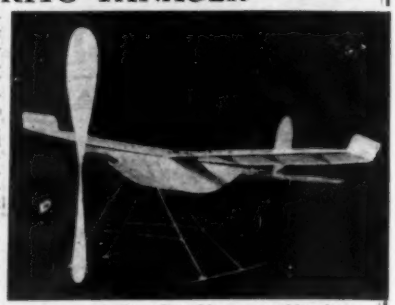
The Sensation of the New York Show
MOSKITO TANAGER

This safety model, big sensation of the New York Aviation Show, is guaranteed R.O.G., R.O.W. and to rise off snow or ice. Will not dive, tail-spin, ground-loop or do any other unwanted stunts. Uses newly discovered safety principles. Complete kit contains bentwood propeller, extra propeller blank, all wood cut to fit, cement, dope, fittings already made, etc. Also full size blueprints. In other words, everything to make this amazingly stable, long flying, safety model, the best plane you ever built. Get this newest kit of the famous Moskito designers at the bargain price of $1.00 postpaid.



MOSKITO TANAGER—$1.00 POSTPAID

Read these Startling Prices

Because Moskito deals in tremendous volume, we can offer rockbottom prices on all model supplies. Prompt service. All items guaranteed. Save this page.

All prices postpaid.

Orders less than $.50 not filled.

		Price
Large Tubes Aero Cement		.15 each
2 oz. bottles Aero Dope		.20 "
2 oz. bottles thinner		.20 "
Cement in Cans—2 oz.		.25 "
Small tubes cement		.10 "
Bottles Banana Oil with brush		.10 "
Sheets Japanese Tissue Paper	21 x 25"	.05 "
Sheets Japanese Bamboo Paper	24 x 36"	.14 "
Sheets Cellophane	12 x 24"	.12 "
Sheets Three Ply Veneer	12 x 24"	.30 "
Following strips of rubber in lengths of 25 and 100 feet—		
1/16 x 1/32"		.01 per foot
1/16 x 1/16"		.01 " "
1/8 x 1/8"		.02 " "
1/8" flat		.01 " "
3/16" flat		.01½ "
Pcs. No. 60 Drill Wire 36" long		.10 each
Piano Wire, 10 ft. rolls		.01 per foot
Spools of Steel Hair Wire		.10 each
Pcs. Flat Bamboo each 15" long		.02 "
Winders		.30 "
Packages Aluminum Powder		.10 "
Fittings—Envelopes containing the following—1 propeller hanger, 1 shaft, 1 small wing clip, 1 large wing clip, 1 wire can, 1 rear hook, two washers, two bearings		.10 per pkg.
Washers		.10 " "
Bearings		.10 " "
Propeller Blocks (Shaped)	6" long	.08 each
" " "	7" "	.10 "
" " "	8" "	.12 "
" " "	9" "	.14 "
" " "	10" "	.16 "
" " "	11" "	.18 "
" " "	12" "	.20 "
" " "	16" "	.28 "
Bentwood Propellers	6" long	.12 "
" "	7" "	.14 "
" "	8" "	.16 "
" "	9" "	.18 "
" "	10" "	.20 "
" "	11" "	.22 "
" "	12" "	.24 "
" "	16" "	.32 "
Balsa Wing Rib Sets		.35 per set
Balsa Entering Edge Sticks		.10 each
Small Wheels		.02 "
Medium Wheels		.03 "
Large Wheels		.05 "

Wings for You!

Join the
American Sky Cadets

The insignia of the American Sky Cadets—illustrated above—identifies the wearer as an air-minded chap who already knows something about the intricate and interesting problems of airplane design and construction and is rapidly learning more. For the American Sky Cadets is the most helpful organization of its kind in existence. If you are air-minded you should become a member and wear the handsome silver wings which every cadet receives free upon joining. And if you are promoted to the commission of Flight Commander or Squadron Commander, as you very likely may be, you can replace the silver wings with the gold wings which will be sent to you with your commission. Read what you get with your membership in addition to the insignia.

An Organization of Air-Minded Boys

The American Sky Cadets conduct City, State and National Contests for airplane model builders. Cups and medals are awarded to successful entrants. Every cadet is elegible to compete.

Free consultation with the Aviation Advisory Board is always available to each cadet. The Advisory Board will answer your questions and help you with construction difficulties.

Each Cadet receives, free, a MOSKITO airplane kit at the beginning of his membership.

Membership entitles you to twelve consecutive issues of MODEL AIRPLANE NEWS, the official magazine, which besides many thrilling stories of adventures in aviation, prints scale plans and other information of special interest to every model builder.

The first issue will arrive shortly after you have received your official membership card and the handsomely colored certificate of membership which is your authority to wear the wings without question.

Here is the opportunity you have been looking for! If you are interested in building and flying model airplanes, if you wish to learn airplane designing, if you wish to grow up to be a leader in this great industry of aviation, become an American Sky Cadet today! Join the leaders. Receive the latest scale plans each month. Accept expert guidance in building your models. Enter them in the official contests open only to American Sky Cadets. Learn the latest things of interest to model builders. Read the best, most thrilling stories about the romantic business of flying that are being published. All of these benefits are yours for less than the price of the magazine alone. Fill out the coupon, enclose $1.50 and mail it to the Administrator, American Sky Cadets. 1926 Broadway, New York City, TODAY!

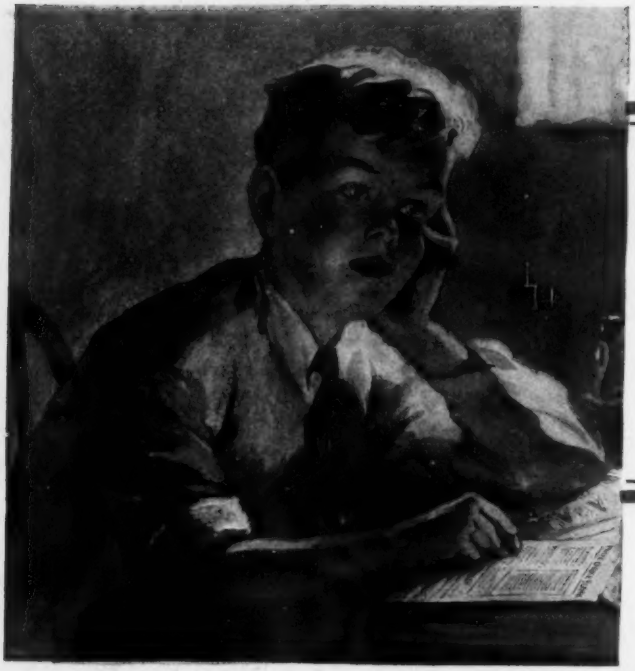
Dear Administrator:

I want to be an AMERICAN SKY CADET, because I am air-minded! I am enclosing $1.50.

Name.....Age .....

Address..... City..... State.....

When I have obtained 10 more members please make me a Flight Commander and send me my gold wings to replace my silver ones



GEE!

What a Peachy Pen

Just the thing for my home-work and all my other writing—

FREE TEN DAYS TRIAL

FRANKLIN SURETY CO. Assets over $1,000,000 guarantees fulfillment of all promises in this ad.

PATENTED THE NEW IMPROVED TRADE-MARK REG.

INKOGRAPH PENCIL POINTED PEN

The Perfect Writing Instrument

A FOUNTAIN PEN—BUT DIFFERENT!

ONLY $2

JUST the pen you've been looking for—ideal for school and home use. Writes as smoothly and easily as a lead pencil—but writes with any color ink on cheapest or finest paper without a miss, skip, or blur.

Anyone can use your Inkograph as the round smooth 14kt. gold writing point cannot be spread, injured, or distorted by any style of handwriting.

Combines the best features of pen and pencil, minus their weak points, plus improvements over both.

Patent automatic feed prevents point from clogging. No complicated mechanism to clean or get out of order.

Makes 1 to 4 carbon copies with original in ink. Ideal for home work, school work or private correspondence if you desire to keep a copy for future reference.

Draws lines to a ruler without a smear or smudge.

Beautifully made of finest lustrous fountain pen material with 14kt. solid gold point and feed, safety screw cap, self-filling lever, and clip on cap. It is the equal in quality of pens selling at a considerably higher price.

If dissatisfied with your fountain pen—try an Inkograph. If it does not prove entirely satisfactory, is not the handiest, best and smoothest writing instrument you ever used, return it to us and we will refund your money.

Take advantage of our 10-day trial offer and join the many thousands who tell us that regardless of price the Inkograph is the best writing instrument they have ever used.

Also made in very attractive $3.00 styles, red, black or mottled hard rubber with 14kt. gold filled band and clip on cap and gold self-filling lever. All $2.00 styles are black only with nickel lever and clip.

INKOGRAPH CO. Inc., *World's Largest Manufacturers of Pencil Pointed Pens*
469-150 Centre Street, New York, N. Y.
Prices outside U. S. A., $2.00 styles, $2.50; $3.00 styles, $4.00; and remittance must accompany order.

DEALERS: Stationery stores, Drug Stores, Department Stores, etc., send for our catalog and trade prices.

$1000 REWARD to anybody who can prove that these testimonials were solicited by us.

Am a bank teller. Can pick up Inkograph any time in any position it writes immediately all words and numbers the same, try and do it with any other pen. Can honestly say I never found a pen so easy and tireless to write with. —C. R. Moorely, Allentown, Pa.

You don't have to prime it or pet it to get it started. Works great. —W. H. Brown, Tampa, Fla.

Have improved 50% in my handwriting since using your Inkograph. —J. R. Reed, Louisville, Ky.

Wrote 18 to 22 letters and addressed that many envelopes besides other writings with one filling.—H. L. Connelly, Evanston, Ill.

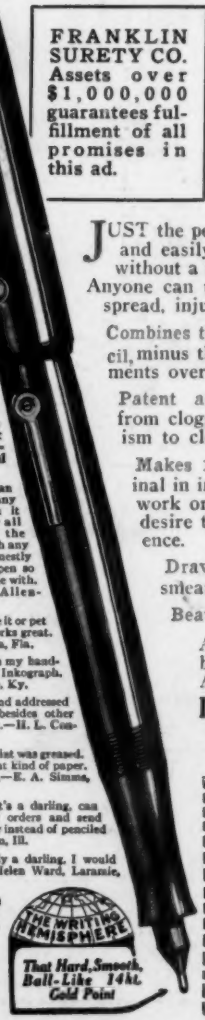
Writes smoothly, like point was greased. Makes no difference what kind of paper. Fine for shipping tags.—E. A. Simms, Jersey City, N. J.

Am tickled skinny. It's a darling, can make carbon copies of orders and send original in ink to factory instead of penciled sheet.—A. Watson, Elgin, Ill.

My Inkograph is simply a darling. I would own no other.—Miss Helen Ward, Laramie, Wyoming.

AGENTS

Send for Inkograph or FREE sales plan booklet. Sells on sight, no investment, immediate commissions.



ONLY WHEN ORDERING $3.00 Styles mark X after color desired

Red ☐
Mottled ☐
Black ☐

SEND NO MONEY

Your name and address are sufficient

INKOGRAPH CO., Inc. 469-150 Centre St., New York

You may send me Inkograph. I will pay postman $..... plus postage on delivery. **NOTE:** When remittance accompanies order Inkograph will be sent postpaid.

Name.....

Address.....

City..... State.....